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Reduce Building Energy Consumption By Improving the Supply Air Temperature Schedule and Recommissioning the Terminal Boxes

Submitted to the
Energy Management and Operations Division
at the M. D. Anderson Cancer Center

by the
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Executive Summary

At the request of the Energy Management and Operations Department at M. D. Anderson Cancer Center, the Energy Systems Laboratory of Texas A&M University performed a study of optimizing the HVAC operation at its Basic Research Building.

The Basic Research Building (BRB) at M. D. Anderson (MDA) is a seven-story building with a total of 123,000 ft^2 conditioned floor area. The building consumed about 81,000 MMBtu chilled water, 41,000 MMBtu steam, and 7.6 MMkWh in 1992 according to LoanSTAR measured data. This energy consumption translates into an annual cost of $1,568,000/yr.

This study investigated the improved cold deck settings under current mechanical conditions as well as the optimal cold deck settings when the current mechanical problems are solved. Improvements to the cold deck setting can be made prior to any mechanical repairing. The improved cold deck setting can reduce annual energy cost by $101,400/yr.

Terminal reheat leakage and excessive air flow are the major problems in this building. These problems caused excessive energy consumption as well as personal comfort complaints. We recommend that the air flow be balanced and repairs to the leaking hot water valves in the terminal boxes be made. After these repairs, the cold deck temperature settings can be optimized, and an addition $89,000/yr savings can be achieved.

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Reduce Building Energy Consumption By Improving the Supply Air Temperature Schedule and Recommissioning the Terminal Boxes

1.0 Introduction

At the request of the Energy Management and Operations Department at M. D. Anderson Cancer Center, the Energy Systems Laboratory of Texas A&M University performed an optimization study of the HVAC operation at the MDA Basic Research Building.

The Basic Research Building at M. D. Anderson is a seven-story building with a total of 123,000 ft^2 conditioned floor area. Mechanical rooms and laboratories occupy the ground floor, the library is on the first floor, and the second to seventh floors contain laboratories and offices. Four single-duct air handling units (AHU) supply about 150,000 CFM outdoor air to the laboratories and offices (93,000 ft^2) in the building. One dual duct volume system sends about 27,000 CFM air (50% outdoor air intake) to the library (20,000 ft^2), and three small single-duct air handling systems cool the mechanical room (6,700 ft^2) with 100% return air.

The building consumed about 81,000 MMBtu chilled water, 41,000 MMBtu steam, and 7.6 MMkWh in 1992 according to LoanSTAR measured data. This energy consumption translates into an annual cost of $1,568,000/yr with the following energy prices:

$10.72/MMBtu for chilled water

$10.70/MMBtu for steam

$0.0504/kWh for electricity.

The building had a lighting retrofit in late 1992 and implemented outside air reset in November 1993. These two measures have reduced the building energy cost by $389,000/yr.

This study investigated the best cold deck settings under the current mechanical conditions as well as the optimal cold deck setting when the current mechanical problems

are solved. Summaries of the field test procedures and measured results, the improved cold deck settings and the potential savings under the current mechanical system conditions, and the optimal cold deck setting when the current mechanical problems are fixed as well as associated savings are presented in this report.

2.0 Field Test Procedures and Results

The field test procedure was designed to identify the failed reheat control valves, excessive air flow rates, as well as inappropriate pressure levels in a number of pre-selected rooms. This test procedure is described below:

Step 1: Measure the room air temperature, room air humidity, and the diffuser discharge air temperature.

Step 2: Record the thermostat setting as well as the date and time.

Step 3: Turn down the thermostat to the minimum temperature settings and measure the lowest discharge air temperature.

Step 4: Turn up the thermostat to the maximum temperature settings and measure the highest discharge air temperature.

This test is performed for each terminal box provided that it is accessible.

Since the tests were performed during normal office hours, a relatively higher diffuser discharge air temperature may indicate excess air flow for the room served by the diff ;er. Although direct air flow rate measurement results are better than this indirect measurement, it is extremely hard or impossible to measure the air flow rate directly.

If the minimum discharge air temperature is higher than the cold deck discharge air temperature, which was measured by the EMCS system at the same time, the reheat control valve is not working properly. If both the minimum and the maximum diffuser discharge air temperature are the same, the reheat control valve or the thermostat is dead.

This test was performed on 210 of 248 terminal boxes in the laboratory section. We could not test 38 terminal boxes in this section because we could not enter the rooms. We

also measured the diffuser's discharge air temperature at 10 of 15 boxes in the library section. However, we were unable to adjust the thermostat either to the minimum or to the maximum. We could not perform the test in the animal room section. Table 1 summarizes the part of the test results in the laboratory section.

Table 1: Summary of the Test Results in the laboratory Section

AHUs	AHU-1	AHU-2	AHU-5	Total/Average
Tested Boxes	72	70	68	210
Untested Boxes	22	4	12	38
Total Boxes	94	74	80	248
Rooms' Temp. °F	74.3	73.7	73.6	73.9
Rooms' RH	39.6	36.4	37.4	37.8
Average $T_{o.a}$ °F	69.6	69.0	67.5	68.7
Average T_{cold} °F	56.0	54.4	52.6	54.3
Average $T_{diffuser}$ °F	64.6	62.2	64.0	63.6

The test results show that the AHUs cooled the outside air from 68.7 °F to 54.3 °F, then the terminal reheat coil warmed the cold air from 54.3 °F to 63.6 °F during the test period. Clearly, significant unnecessary reheat is presented in this building.

The detailed test results are attached in Appendix A, which lists room number, type, box size, designed CFM, hot water flow rate, test time, room temperature, relative humidity, ambient temperature, cold deck discharge air temperature, diffuser discharge air temperatures when thermostat is in normal, the minimum, and the maximum position, and the normal thermostat set point.

Since, the full test could not be performed for the library and the animal room sections, the rest of the report will discuss the laboratory section only, which are served by AHUs 1, 2, and 5.

3.0 Improved current cold deck settings

The current cold deck settings can be improved prior to any mechanic repair according to the test results.

Figures 1, 2, and 3 present the measured diffuser and cold deck discharge air temperature versus the ambient temperature for AHUs 1, 2, and 5, respectively. According to the test results, the current cold deck settings are summarized in Table 2.

Table 2: Measured Current Cold and Suggested Improved Cold Deck Settings

AHU	Current	Suggested
AHU-1	If $T_{o.a.}$ < 70 °F then 58 °F else 55 °F	If $T_{o.a.}$ < 70 °F then 61 °F else 57 °F
AHU-2	If $T_{o.a.}$ < 70 °F then 55°F else 53 °F	If $T_{o.a.}$ < 70 °F then 57 °F else 55 °F
AHU-5	If $T_{o.a.}$ < 70 °F then 53°F else 51 °F	If $T_{o.a.}$ < 70 °F then 55 °F else 55 °F
Average	If $T_{o.a.}$ < 70 °F then 55.3°F else 53.0 °F	If $T_{o.a.}$ < 70 °F then 57.7 °F else 55.7 °F

Figures 1, 2, and 3 show that the diffuser discharge air temperatures are higher than the cold deck discharge air temperature by more than 3 °F for most of the terminal boxes. Therefore, the cold deck temperature can be increased without influencing the room conditions. The suggested improved cold deck settings are also summarized in Table 2 for each AHU.

The potential energy savings for the improved cold deck settings were determined by the simplified engineering model simulation, which was calibrated using the measured data in this building. The simulation uses the bin weather data in 1993. The annual consumption was simulated under both the current and improved the cold deck settings. The potential savings is taken as the difference of the energy consumption under these two cold deck settings.

The simulation results show that the improved cold deck setting can reduce chilled water consumption by 6,432 MMBtu/yr and steam by 3,037 MMBtu. This energy consumption is worth $101,400/yr according to the current energy prices of $10.72/MMBtu for chilled water and $10.70/MMBtu for steam. The detailed simulation results are summarized in Table 3.

Figure 1: Measured Cold Deck and Diffuser Discharge Air Temperatures (AHU: RB-1)

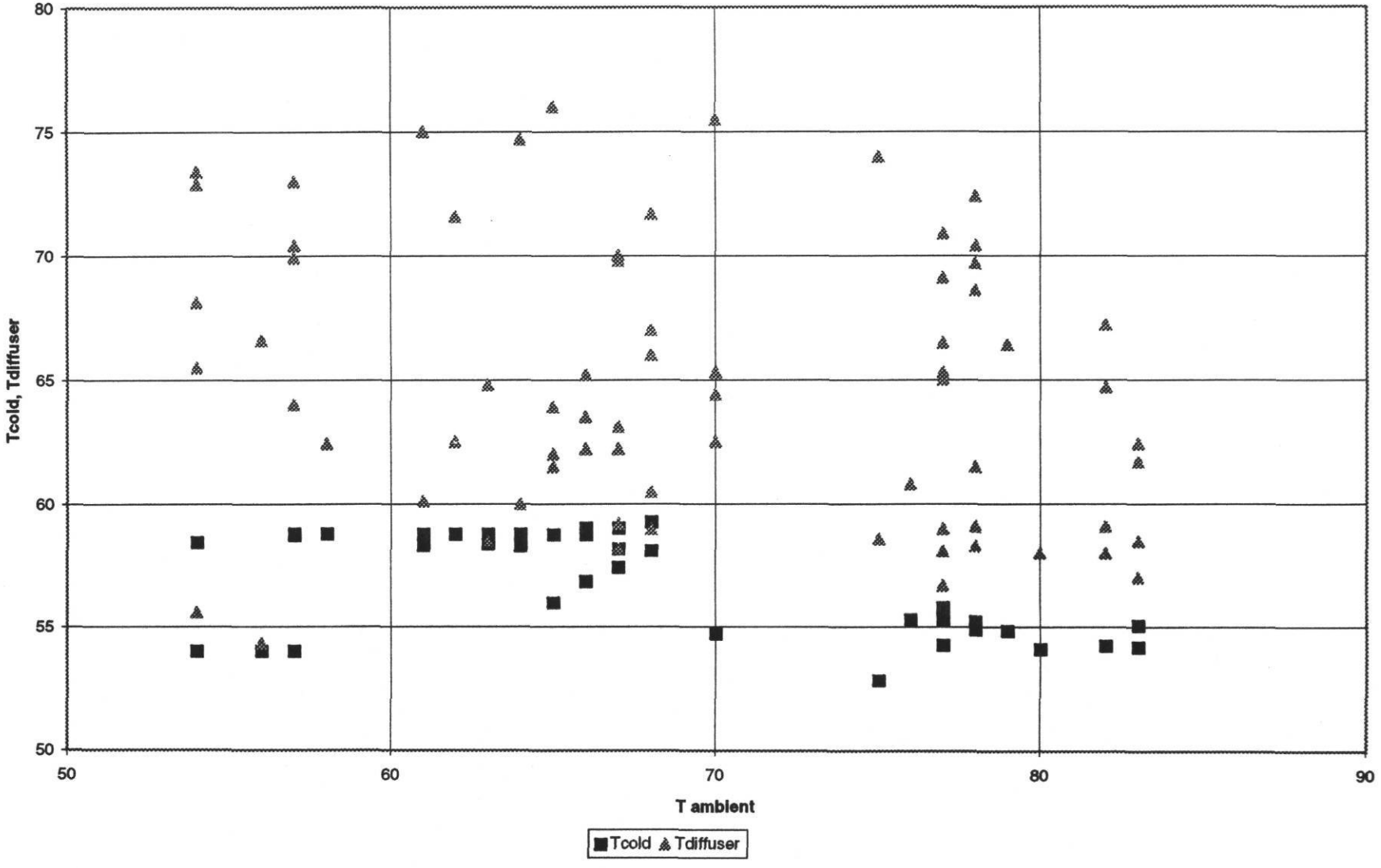

Figure 2: Measured Cold Deck and Diffuser Discharge Air Temperature (AHU: RB-2)

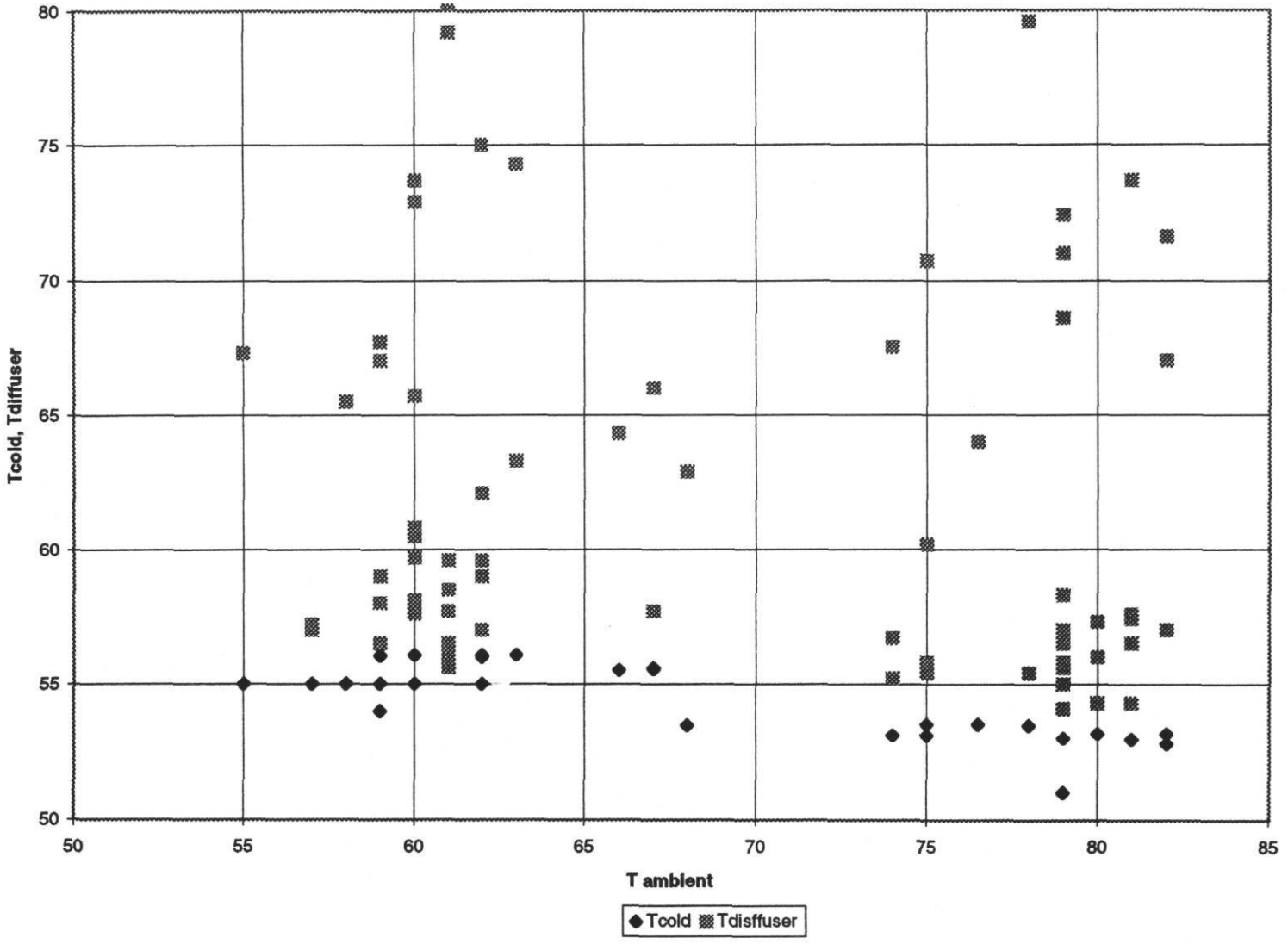

Figure 3: Measured Cold Deck and Diffuser Discharge Air Temperature (AHU: RB-5)

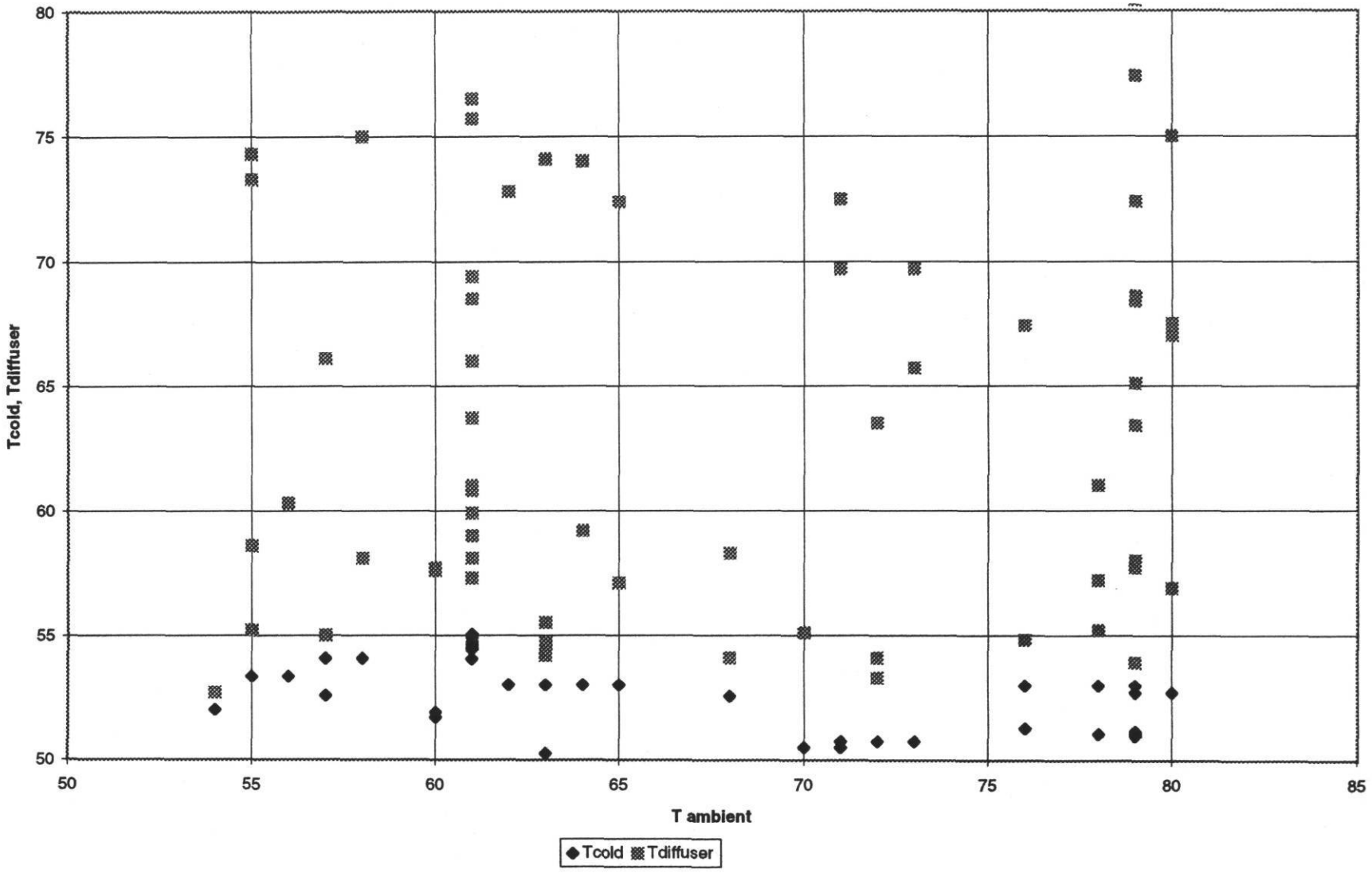

Table 3: Potential Savings Due to Improved Cold Deck Settings

		Current case					Suggested case				Potential savings	
Tdry	Tdew	bin	EC2	Eh2	Cooling	Heating	EC2	Eh2	Cooling	Heating	Cooling	Heating
F	F	Hours	MMBtu/hr	MMBtu/hr	MMBtu	MMBtu	MMBtu/hr	MMBtu/hr	MMBtu	MMBtu	MMBtu	MMBtu
28	27	1	0.00	6.36	0	6	0.00	6.36	0	6	0	0
31	30	7	0.00	5.53	0	39	0.00	5.53	0	39	0	0
34	30	16	0.00	5.01	0	80	0.00	5.01	0	80	0	0
37	34	25	0.00	4.07	0	102	0.00	4.07	0	102	0	0
40	37	73	0.00	3.29	0	240	0.00	3.29	0	240	0	0
43	38	179	0.00	2.79	0	499	0.00	2.79	0	499	0	0
46	40	229	0.00	2.29	0	525	0.00	2.29	0	525	0	0
49	42	403	0.00	1.80	0	725	0.00	1.80	0	725	0	0
52	43	365	0.00	1.31	0	479	0.00	1.31	0	479	0	0
55	46	417	0.26	1.08	107	452	0.00	0.83	0	345	107	107
58	49	495	0.69	1.04	343	516	0.30	0.65	148	321	195	195
61	52	540	1.12	1.00	607	540	0.73	0.61	396	329	211	211
64	56	510	2.21	0.96	1,126	489	1.26	0.57	641	291	485	198
67	59	623	3.35	0.92	2,087	572	2.41	0.53	1,498	331	589	241
70	62	666	5.41	1.25	3,604	830	4.40	0.81	2,930	541	674	289
73	64	701	6.38	1.20	4,470	839	5.37	0.77	3,765	537	705	302
76	69	925	8.34	1.14	7,713	1,054	7.34	0.71	6,790	657	922	397
79	70	867	9.06	1.08	7,856	937	8.07	0.65	6,996	566	860	371
82	68	585	8.77	1.02	5,128	597	7.78	0.60	4,551	349	577	249
85	70	472	9.81	0.96	4,630	455	8.83	0.54	4,166	255	464	200
88	72	369	10.88	0.91	4,015	334	9.91	0.48	3,656	179	360	155
91	72	213	11.24	0.85	2,395	180	10.27	0.43	2,188	91	207	89
94	71	69	11.25	0.79	776	54	10.28	0.37	709	26	67	29
96	68	11	10.49	0.75	115	8	9.52	0.33	105	4	11	5
Total					44,970	10,551			38,539	7,514	6,432	3,037
Dollar											$68,946	$32,492

Chilled water price $10.72/MMBtu

Steam price $10.70/MMBtu

4.0 Optimal Cold Deck Settings

Figure 4 shows the measured cold deck and diffuser temperature versus the ambient temperature. It shows that the current average cold deck setting changes from 56 °F to 53 °F when the ambient temperature varies from 55 °F to 83 °F. The average diffuser discharge air temperature changes from 64 °F to 62 °F. If we increase the air flow rates where the discharge air temperatures were lower and decrease the air flow rate where the discharge air temperature were high, then, the diffuser discharge air temperature can be adjusted to the range of 60°F to 65°F. Consequently, the cold deck discharge air temperature can be set to a high range of 60 °F to 65 °F provided that room relative humidity conditions are satisfied.

To adjust the diffuser discharge air temperature to a range of 60 °F to 65 °F, the hot water leakage problems have to be fixed in a number of terminal boxes and the air flow rates have to be adjusted in a number of terminal boxes. These are discussed in the next section.

Since the measured room relative humidity varies from 30% to 50% with an average value of 40%, the cold deck discharge air temperature can be set as high as 60°F when the ambient temperature is lower than 60 °F. The cold deck discharge air temperature can be adjusted within a range of 59 °F to 56°F when the ambient temperature varies from 60 °F to 100 °F.

The potential saving for the optimized cold deck settings are 12,095 MMBtu/yr for chilled water and 5,607 MMBtu/yr for the steam. These energy savings are worth $189,700/yr. The detailed results are summarized in Table 4.

Figure 4: Measured Deck & Diffuser Discharge Air Temperature

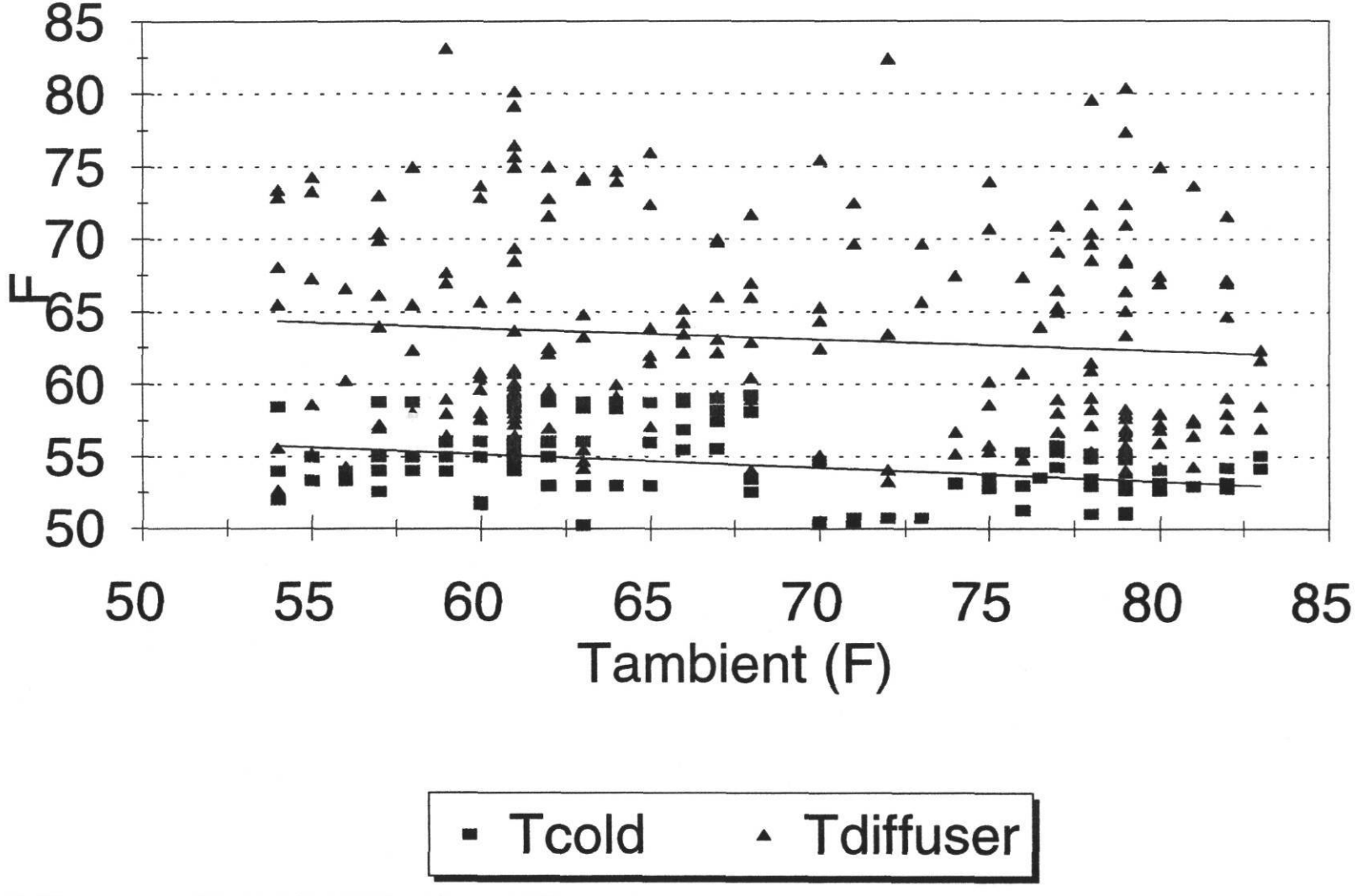

Table 4: Potential Savings Due to Improving Cold Deck Settings After Commissioning Terminal Boxes

		Current case					Optimal case				Potential savings	
Tdry	Tdew	bin	EC2	Eh2	Cooling	Heating	EC2	Eh2	Cooling	Heating	Cooling	Heating
F	F	Hours	MMBtu/hr	MMBtu/hr	MMBtu	MMBtu	MMBtu/hr	MMBtu/hr	MMBtu	MMBtu	MMBtu	MMBtu
28	27	1	0.00	6.36	0	6	0	6.356	0	6	0	0
31	30	7	0.00	5.53	0	39	0	5.532	0	39	0	0
34	30	16	0.00	5.01	0	80	0	5.009	0	80	0	0
37	34	25	0.00	4.07	0	102	0	4.071	0	102	0	0
40	37	73	0.00	3.29	0	240	0	3.29	0	240	0	0
43	38	179	0.00	2.79	0	499	0	2.788	0	499	0	0
46	40	229	0.00	2.29	0	525	0	2.291	0	525	0	0
49	42	403	0.00	1.80	0	725	0	1.798	0	725	0	0
52	43	365	0.00	1.31	0	479	0	1.311	0	479	0	0
55	46	417	0.26	1.08	107	452	0	0.828	0	345	107	107
58	49	495	0.69	1.04	343	516	0	0.35	0	173	343	343
61	52	540	1.12	1.00	607	540	0.394	0.271	213	146	394	394
64	56	510	2.21	0.96	1,126	489	0.869	0.276	443	141	682	348
67	59	623	3.35	0.92	2,087	572	1.772	0.281	1,104	175	983	397
70	62	666	5.41	1.25	3,604	830	3.096	0.286	2,062	190	1,542	639
73	64	701	6.38	1.20	4,470	839	4.184	0.285	2,933	200	1,537	639
76	69	925	8.34	1.14	7,713	1,054	6.272	0.274	5,802	253	1,911	800
79	70	867	9.06	1.08	7,856	937	7.113	0.262	6,167	227	1,689	710
82	68	585	8.77	1.02	5,128	597	6.931	0.248	4,055	145	1,073	452
85	70	472	9.81	0.96	4,630	455	8.088	0.236	3,818	111	812	343
88	72	369	10.88	0.91	4,015	334	9.275	0.223	3,422	82	593	252
91	72	213	11.24	0.85	2,395	180	9.746	0.209	2,076	45	319	136
94	71	69	11.25	0.79	776	54	9.857	0.195	680	13	96	41
96	68	11	10.49	0.75	115	8	9.165	0.185	101	2	15	6
Total					44,970	10,551			32,875	4,944	12,095	5,607
Dollar											$129,663	$59,993

Chilled water price $10.72/MMBtu
Steam price $10.70/MMBtu

5.0 Adjusting Air Flow and Repairing Terminal Box

Since the current load situations could be quite different with the design conditions, the air flow rate has to be adjusted so that the diffusers have about the same discharge air temperature. The air flow rate adjustment was determined by the following formula:

$$\beta = 1 - \frac{T_{room} - T_{diffuser}^{ave}}{T_{room} - T_{diffuser}}$$

Where β is the air flow reduction fraction (if it is positive the air flow should be increased otherwise the air flow rate should be decreased); T_{room} is the room air temperature; $T_{diffuser}$ is the diffuser discharge air temperature; and the $T_{diffuser}^{ave}$ is the average diffuser discharge air temperature for the AHU.

Note that the air flow correct formula was deduced based upon the same load ratio for each room. This assumption is considered correct for this building due to (1) most of the rooms are exterior rooms and have similar internal and exterior loads and (2) the test was performed under the similar weather conditions.

If the air adjusting faction is higher than 0.3, the air flow rate should be adjusted. However, the air flow adjustment should be lower than 0.5. We do not suggest adjusting the air flow when the adjusting fraction is lower than 0.3 because of the measurement uncertainties. According to the measured results, the air flow rate should be adjusted for 137 terminal boxes. The detailed information are listed in Appendix B.

The control valve leakage was defined as the temperature difference between the minimum diffuser discharge and the cold deck discharge air temperature. If this temperature difference is higher than 3°F, then it is suggested to repair the valve or terminal box. If the diffuser discharge air temperature does not respond to the thermostat, it is suggested to check the thermostat and repair the control valve. It was found that there are about 122 terminal boxes that need to be repaired. Table 5 summarizes the basic results.

Table 5: Summary of the Mechanical Repair Work

AHU	Repair Reheat Coils	Air Flow Balance
AHU-1	49	49
AHU-2	29	40
AHU-5	44	47

6.0 Room Pressure Level

The pressure difference between the room and the corridor was measured for 22 laboratory rooms which includes 14 rooms selected by MDA for area of concern. The pressure difference was measured with the door closed for 21 rooms. The door could not be closed for room RB5.023 during the test. The positive pressure difference infers a higher room pressure. The measurement results are summarized in Table 6.

Table 6: Summary of the Room Pressure Level Measurement

Room	Pressure		Air Flow	Valve or damper	Time
No.	Posi./Nega.	Pa	Red/Inc	Repairing Meas.	mo/day/hr/min
RB4.019*	Positive	+3.42	-50%	No repaires are needed	10/28/13/03
RB5.009*	Positive	+4.38	-32%	No repaires are needed	10/28/12/57
RB5.014*	Positive	+4.22	-50%	Repair steam valve & damper	10/28/12/38
RB5.018*	Negative	-0.59	44%	No repaires are needed	10/28/12/44
RB5.023*	Zero	0.00	-50%	Repair steam valve & damper	10/28/12/48
RB5.024*	Zero	0.00	-50%	Repair steam valve & damper	10/28/12/53
RB6.002*	Positive	+4.97	-24%	No repaires are needed	10/28/12/20
RB6.009*	Positive	+4.97	-50%	Repair steam valve & damper	10/28/12/30
RB6.014*	Positive	+6.41	12%	Repair thermostat &steam valve	10/28/12/05
RB6.018*	Zero	0.00	32%	No repaires are needed	10/28/12/14
RB7.012*	Positive	+1.71	30%	No repaires are needed	10/28/11/25
RB7.016*	Positive	+0.16	56%	No repaires are needed	10/28/11/42
RB7.024*	Positive	+0.27	41%	Repair steam valve & damper	10/28/11/48
RB7.028*	Positive	+0.43	-50%	Repair steam valve & damper	10/28/11/54
RB3.023	Negative	-0.53	28%	Repair steam valve & damper	10/25/10/35
RB4.013	Negative	-0.53	-50%	Repair steam valve & damper	10/25/09/05
RB4.018	Negative	-1.60	28%	Repair thermostat	10/25/15/35
RB4.020	Negative	-2.67	19%	Repair steam valve & damper	10/25/15/10
RB4.023	Negative	-0.75	22%	No repaires are needed	10/25/14/42
RB4.028	Negative	-2.14	35%	Repair steam valve & damper	10/25/14/00
RB4.033	Negative	-0.53	-50%	Repair steam valve & damper	10/25/13/20
RB4.039	Positive	+2.67	18%	Check terminal box	10/25/12/56

* room selected by MDA for area of concern

The positive and zero pressure level was measured in 14 rooms. The excessive air supply exists in 8 of these 14 rooms (4.019, 5.009, 5.014, 5.023, 5.024, 6.002, 6.009, 7.028). After the excessive air supply is reduced, the room pressure level may be reduced to negative level. However, it is suggested to check the exhaust hood in the following

rooms: 4.039, 6.014, 6.018, 7.012, 7.016, and 7.024. It may be necessary to increase the exhaust air flow rate in these rooms.

7.0 Conclusions

The cold deck setting can be improved prior to any mechanical repairing. The suggested improved cold deck setting can reduce the annual energy cost by $101,400/yr.

Terminal reheat leakage and excessive air flow are the major problems in this building. These problems caused excessive energy consumption as well as personal comfort complaints. We suggested to rebalance the air flow and repair the leakage hot deck in the terminal box. After these repair works, the cold deck can be optimized, and an addition $89,000/yr savings can be achieved.

Appendix A: Summary of the Field Test Results

The terminal box size, CFM and GPM values were taken from the initial mechanical design drawing. These values are just a reference.

The room temperature, relative humidity, and the diffuser discharge air temperatures were measured using the hand-held meter while the cold deck discharge air temperature was measured by the EMCS system.

The readings of the highest discharge air temperatures were not measured for the terminal boxes which serves the interior zones.

AHU-1

DATE:	October 24 to October 28, 1994													
UNIT ID:	RB 1													
											DIFFUSER DISCHARGE TEMP (F)			
UNIT LOC/SERVES	TYPE	SIZE	CFM	GPM	DAY	TIME	RM. TEMP	ROOM	AMBIENT	COLD DECK	*AT ORIGINAL*	*AT MINIMUM*	*AT MAXIMUM*	ORIGINAL
ROOM #							F	RH	TEMP.	DISCHARGE	THERMOSTAT	THERMOSTAT	THERMOSTAT	THERMOSTAT
									F	TEMP (F)	SETTING	SETTING (50 F)	SETTING (86 F)	SETTING (F)
							Troom		Tambient	Tcold	Tdiffuser			
RB 6.008	LAB 4	7	500	1.0	W	3:30 PM	77.0	26.00	67.0	58.20	58.2	58.2	▲	70.0
RB 7.035B	LAB	5	270	0.5	F	10:10 AM	76.6	35.80	63.0	58.40	58.5	58.5	▲	50.0
RB 6.034	DARK	4	100	0.25	W	5:02 PM	69.6	34.00	68.0	58.13	59.0	58.2	60.4	77.0
RB 6.040	OFF	7	450	1.0	W	4:10 PM	72.3	30.00	68.0	59.28	60.5	60.0	▲	74.0
RB 7.035	WORK AREA	10	450		F	9:35 AM	76.0	37.00	61.0	58.80	60.1	60.1	64.0	50.0
RB 7.007	DARK	5	275	0.7	F	10:15 AM	73.5	36.50	64.0	58.32	60.0	60.0	▲	77.0
RB 6.013	LAB	6	360	0.75	W	2:51 PM	77.7	28.00	67.0	57.43	59.2	59.2	▲	50.0
RB 2.032	OFF	N/A	N/A	N/A	M	11:10 AM	71.7	48.10	77.0	55.81	58.1	55.5	▲	68.0
RB 2.031	OFF	N/A	N/A	N/A	M	11:15 AM	69.9	49.90	77.0	54.27	56.7	N/A	N/A	N/A
RB 7.012	CHEMICAL RM	5	240	0.5	F	10:40 AM	72.0	37.00	65.0	58.78	61.5	61.5	▲	50.0
RB 2.013	LAB	6	360	0.75	M	1:46 PM	71.6	48.20	83.0	54.19	57.0	57.0	57.0	
RB 4.012	EQUIP	6	360	0.75	TU	4:10 PM	75.0	45.00	78.0	54.89	58.3	58.3	59.0	N/A
RB 2.009	EQUIP	9	660	1.25	M	1:57 PM	71.4	51.10	83.0	55.07	58.5	58.2	▲	75.0
RB 7.011	LAB	5	200	0.5	F	11:00 AM	75.3	36.60	66.0	58.77	62.2	61.1	61.2	68.0
RB 7.034B	OFF	6	405	1.0	F	9:18 AM	70.6	43.60	58.0	58.82	62.4	62.3	▲	55.0
RB 7.035F	LAB	6	415	1.0	F	9:45 AM	77.0	38.00	62.0	58.79	62.5	63.0	N/A	72.0
RB 3.012	LAB	6	360	0.75	M	4:16 PM	70.6	50.00	82.0	54.25	58.0	58.0	▲	68.0
RB 3.008	LAB 4	7	500	1.0	M	4:37 PM	76.2	42.30	82.0	54.25	58.0	58.0	▲	77.0
RB 4.040	OFF	7	450	1.0	TU	12:50 PM	71.0	44.60	78.0	55.23	59.1	59.1	▲	65.0
RB 2.008	LAB 4	7	500	1.0	M	12:07 PM	72.4	46.00	80.0	54.10	58.0	N/A	N/A	N/A
RB 2.012	LAB	6	360	0.75	M	1:52 PM	73.4	46.70	83.0	54.19	58.5	58.5	58.5	
RB 6.033A	OFF	5	190	0.5	W	5:40 PM	75.1	29.60	66.0	59.04	63.5	60.6	▲	71.0
RB 2.040	OFF	7	450	1.0	M	10:45 AM	70.5	51.40	77.0	54.27	59.0	N/A	N/A	N/A
RB 6.012	LAB	6	360	0.75	W	3:00 PM	76.0	28.40	67.0	57.43	62.2	61.2	▲	77.0
RB 3.013	LAB	6	360	0.75	M	4:12 PM	73.3	46.70	82.0	54.25	59.1	59.1	60.0	74.0
RB 7.008D	LAB	7	440	1.0	F	10:37 AM	76.8	36.00	65.0	58.78	63.9	63.1	▲	77.0
RB 3.034	DARK	4	100	0.25	TU	1:30 AM	74.3	49.40	76.0	55.31	60.8	60.8	▲	71.0
RB 6.014	EQUIP	8	525	1.0	W	2:43 PM	76.1	28.00	67.0	57.43	63.1	62.0	62.0	50.0
RB 3.007	DARK	4	100	0.5	TU	11:15 AM	73.4	48.70	75.0	52.83	58.6	58.0	▲	75.0
RB 5.033	LAB	10	945	1.8	W	12:54 PM	73.2	31.40	65.0	56.00	62.0	62.0	▲	50.0
RB 7.035G	LAB	6	365	1.0	F	10:00 AM	75.3	38.00	63.0	58.79	64.8	61.0	▲	72.0
RB 4.014	LAB	8	525	1.0	TU	3:50 PM	74.2	44.00	78.0	54.89	61.5	59.5	▲	67.0
RB 2.014	EQUIP	8	525	1.0	M	1:40 PM	73.0	45.00	83.0	54.19	61.7	59.8	▲	68.0
RB 6.007	OFF	4	100	0.5	W	3:40 PM	76.6	30.00	68.0	59.28	67.0	60.0	▲	76.0
RB 3.036	EQUIP	5	280	0.5	TU	9:05 AM	78.7	41.30	70.0	54.71	62.5	60.2	▲	73.0
RB 6.040A	OFF	6	380	0.8	W	4:45 PM	76.5	28.80	68.0	58.13	66.0	64.4	▲	69.0
RB 2.036	EQUIP	5	280	0.5	M	2:03 PM	71.0	51.00	83.0	54.19	62.4	62.4	62.4	56.0
RB 5.033A	OFF	5	190	0.5	W	2:15 PM	75.3	30.00	66.0	56.85	65.2	59.0	▲	77.0

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UNIT LOC/SERVES ROOM #	TYPE	SIZE	CFM	GPM	DAY	TIME	RM. TEMP F	ROOM RH	AMBIENT TEMP. F	COLD DECK DISCHARGE TEMP (F)	*AT ORIGINAL* THERMOSTAT SETTING	*AT MINIMUM* THERMOSTAT SETTING (50 F)	*AT MAXIMUM* THERMOSTAT SETTING (86 F)	ORIGINAL THERMOSTAT SETTING (F)
RB 7.034	OFF				R	8:18 AM	72.7	36.00	54.0	58.46	68.1	68.1	70.6	68.0
RB 3.033	LAB 5	10	945	1.8	TU	9:15 AM	74.9	44.80	70.0	54.71	64.4	64.4	▲	61.0
RB 3.O14	LAB	8	525	1.0	M	4:06 PM	76.3	46.10	82.0	54.25	64.7	60.5	▲	77.0
RB 3.040	OFF	7	450	1.0	TU	8:40 AM	78.8	41.90	70.0	54.71	65.3	65.3	66.0	72.0
RB 2.033A	OFF	5	190	0.5	M	11:00 AM	73.2	46.50	77.0	54.27	65.0	N/A	N/A	N/A
RB 6.033	LAB	10	945	1.8	W	5:37 PM	74.5	29.70	67.0	59.04	70.0	69.8	▲	68.0
RB 2.033	LAB	10	945	1.8	M	11:01 AM	74.5	44.00	77.0	54.27	65.3	N/A	N/A	N/A
RB 7.033	CONF	6	400	1.0	F	8:50 AM	72.6	40.60	57.0	58.76	69.9	65.8	▲	77.0
RB 4.033A	OFF	5	190	0.5	TU	1:30 PM	73.0	47.50	79.0	54.84	66.4	58.3	▲	77.0
RB 2.040A	OFF	6	380	0.8	M	10:45 AM	72.0	50.00	77.0	54.27	66.5	N/A	N/A	N/A
RB 6.009	LAB	9	660	1.25	W	3:15 PM	77.3	27.00	67.0	57.43	69.8	68.1	▲	68.0
RB 7.035E	LAB	6	365	1.0	F	9:45 AM	77.0	35.00	62.0	58.79	71.6	60.5	▲	77.0
RB 3.009	EQUIP	9	660	1.25	M	4:30 PM	76.9	43.00	82.0	54.25	67.2	61.0	▲	77.0
RB 6.035	CONF	8	570	1.1	W	4:42 PM	75.0	28.90	68.0	58.13	71.7	65.6	▲	73.0
RB 4.013	LAB	6	360	0.75	TU	4:05 PM	76.2	44.00	78.0	54.89	68.6	58.7	▲	74.0
RB 4.033	LAB	10	945	1.8	TU	1:20 PM	74.5	44.40	78.0	55.23	69.7	61.2	▲	68.0
RB 2.O35	CONF	8	570	1.1	M	11:00 AM	75.2	46.70	77.0	54.27	69.1	N/A	N/A	N/A
RB 4.035	CONF	8	570	1.1	TU	1:05 PM	76.8	43.50	78.0	55.23	70.4	58.9	▲	72.0
RB 7.034A	OFF	7	540	1.0	F	9:10 AM	74.0	44.00	57.0	58.82	73.0	62.8	▲	60.0
RB 3.033A	OFF	5	190	0.5	TU	11:45 AM	72.7	47.30	77.0	55.31	70.9	59.8	▲	65.0
RB 7.008	LAB 7	7	580	0.7	F	10:25 AM	76.7	37.30	64.0	58.79	74.7	63.4	▲	73.0
RB 4.034	DARK	4	100	0.25	TU	:15 PM	76.3	42.60	78.0	55.23	72.4	60.2	▲	75.0
RB 5.035	CONF	5	570	1.1	W	1:12 PM	78.1	26.00	65.0	56.00	76.0	62.2	▲	72.0
RB 7.008	LAB 7	8	260	0.6	R	6:30 PM	76.1	32.20	61.0	58.35	75.0	75.6	79.0	86.0
RB 3.035	CONF	8	570	1.1	TU	8:55 AM	76.5	44.80	70.0	54.71	75.5	58.9	▲	79.0
RB 3.R001	RR	6	300	0.75	TU	11:25 AM	75.7	50.20	75.0	52.83	74.0	N/A	N/A	N/A
RB 5.012	EQUIP	6	360	0.75	W	9:58 AM	73.1	34.10	57.0	54.00	69.9	57.0	▲	79.0
RB 5.013	LAB	6	360	0.75	W	9:55 AM	70.3	37.20	57.0	54.00	64.0	N/A	N/A	N/A
RB 5.014	LAB	8	525	1.0	W	10:10 AM	74.5	33.00	57.0	54.00	70.4	64.3	▲	61.0
RB 5.009	EQUIP	9	660	1.25	W	9:35 AM	72.8	32.70	56.0	54.00	66.6	54.0	▲	86.0
RB 5.040	OFF	7	450	1.0	W	9:10 AM	75.2	32.70	54.0	54.00	73.4	55.4	▲	66.0
RB 5.040A	OFF	6	380	0.8	W	9:15 AM	73.9	34.60	54.0	54.00	72.9	54.1	▲	72.0
RB 5.036	EQUIP	5	280	0.5	W	8:58 AM	74.1	39.50	54.0	54.00	55.6	54.6	54.6	75.0
RB 5.034	DARK	4	100	0.25	W	8:45 AM	71.2	38.70	54.0	54.00	65.5	54.8	▲	68.0
RB 5.008	LAB 4	7	500	1.0	W	9:40 AM	71.5	36.00	56.0	54.00	54.3	54.1	▲	59.0
Average							74.30	39.65	69.55	56.00	64.59			
RB 2.007	DARK	4	100	0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RB 2.R005	RR	6	300	0.75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RB 2.H00A	COR	14	1550	3.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RB 2.034	DARK	4	100	0.25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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UNIT LOC/SERVES ROOM #	TYPE	SIZE	CFM	GPM	DAY	TIME	RM. TEMP F	ROOM RH	AMBIENT TEMP. F	COLD DECK DISCHARGE TEMP (F)	*AT ORIGINAL* THERMOSTAT SETTING	*AT MINIMUM* THERMOSTAT SETTING (50 F)	*AT MAXIMUM* THERMOSTAT SETTING (86 F)	ORIGINAL THERMOSTAT SETTING (F)
RB 3.H000A	COR	14	1550	3.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RB 3.040A	OFF	6	380	0.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RB 4.009	EQUIP	9	660	1.25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RB 4.007	DARK	4	100	0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RB 4.R005	RR	6	300	0.75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RB 4.H00A	COR	14	1550	3.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RB 4.040A	OFF	6	380	0.8	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A
RB 4.036	EQUIP	5	280	0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RB 4.008	LAB 4	7	500	1.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RB 5.007	DARK	4	100	0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RB 5.R005	RR	6	300	0.75	W	9:20 AM	75.5	33.30	55.0	54.00	75.7	N/A	N/A	N/A
RB 5.H00A	COR	14	15	3.3	N/A	N/A	N/A	N/A	N/A	n/a	N/A	N/A	N/A	N/A
RB 6.R005	RR	6	300	0.75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RB 6.H00A	COR	14	1550	3.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RB 6.036	EQUIP	5	280	0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RB 7.008A	STOR	4	150	0.5	F	10:35 AM	75.1	38.00	65.0	58.78	N/A	N/A	N/A	N/A
RB 7.004	RR	6	300	0.75	F	9:40 AM	76.0	40.00	61.0	58.80	N/A	N/A	N/A	N/A
RB 7.H00A	COR	16	1650	3.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

DATE:	October 24 to October 28, 1994													
UNIT ID:	RB 2													
											DIFFUSER DISCHARGE TEMP (F)			
UNIT LOC/SERVES	TYPE	SIZE	CFM	GPM	DAY	TIME	RM. TEMP	ROOM	AMBIENT	COLD DECK	*AT ORIGINAL*	*AT MINIMUM*	*AT MAXIMUM*	ORIGINAL
ROOM #							F	RH	TEMP.	DISCHARGE	THERMOSTAT	THERMOSTAT	THERMOSTAT	THERMOSTAT
									F	TEMP (F)	SETTING	SETTING (50 F)	SETTING (86 F)	SETTING (F)
							Troom		Tambient	Tcold	Tdisffuser			
RB 7.016A	OFF	4	150	1.2	R	12:00 PM	67.10	37.80	61.00	55.90	55.90	55.90	▲	50.00
RB 7.018A	OFF	5	500	1.2	R	2:30 PM	71.30	33.50	61.00	55.60	55.60	55.60	56.00	86.00
RB 7.016	LAB 6	6	300	0.7	R	11:55 AM	69.90	35.60	61.00	56.10	56.40	56.40	▲	50.00
RB 7.021	LAB 6	8	215	0.5	R	2:55 PM	73.60	34.00	61.00	55.85	56.50	56.50	58.00	50.00
RB 7.018	LAB 6	8	215	0.5	R	2:05 PM	73.80	31.90	62.00	56.01	57.00	56.00	▲	70.00
RB 4.002	KITCHEN	12	1200	2.8	TU	2:40 PM	70.60	45.00	79.00	53.01	54.10	54.10	▲	59.00
RB 2.023A	LAB 2	5	210	0.6	M	12:02 PM	71.40	45.80	80.00	53.18	54.30	N/A	N/A	N/A
RB 2.018A	LAB 2	5	210	0.6	M	1:21 PM	70.70	46.00	81.00	52.96	54.30	56.30		86.00
RB 5.19	LAB 2	9	700	1.3	W	10:30 AM	73.50	31.00	59.00	55.00	56.50	56.50	▲	50.00
RB 6.019	LAB 2	9	700	1.3	R	10:50 AM	74.00	33.00	60.00	56.06	57.60	57.60	▲	65.00
RB 7.020	LAB 6	8	85	0.3	R	2:30 PM	72.60	35.00	61.00	55.96	57.70	57.50	▲	68.00
RB 4.18	LAB 2	9	700	1.3	TU	3:35 PM	74.30	40.00	78.00	53.48	55.40	54.80	54.80	84.00
RB 6.023	LAB 2	9	700	1.3	R	10:00 AM	73.60	32.00	59.00	56.04	58.00	57.80	▲	70.00
RB 4.011	EQUIP	6	330	0.8	TU	3:05 PM	77.00	39.00	79.00	53.01	55.00	55.00	▲	67.00
RB 5.011	EQUIP	6	330	0.8	W	9:50 AM	65.40	36.50	57.00	55.00	57.00	57.00	▲	50.00
RB 3.22	LAB 1	6	480	0.8	TU	10:45 AM	74.50	42.90	74.00	53.12	55.20	N/A	N/A	N/A
RB 6.011	EQUIP	6	330	0.8	W	3:05 PM	80.50	27.00	67.00	55.54	57.70	57.70	▲	50.00
RB 5.18	LAB 2	9	700	1.3	W	10:18 AM	72.70	31.40	57.00	55.00	57.20	56.00	▲	61.00
RB 3.19A	LAB 2	5	210	0.6	TU	10:58 AM	72.80	43.70	75.00	53.12	55.40	55.40	▲	50.00
RB 7.020B	OFF	5	500	1.2	R	2:35 PM	72.60	38.00	61.00	55.95	58.50	58.50	60.00	50.00
RB 7.006	KITCHEN	6	1200	2.5	TU	3:05 PM	72.90	35.00	79.00	53.01	55.60	55.10	▲	69.00
RB 3.20	LAB 3	12	1320	2.6	TU	10:50 AM	74.10	41.20	75.00	53.12	55.80	55.80	▲	50.00
RB 4.22	LAB 1	6	480	0.8	TU	3:00 PM	75.60	39.00	79.00	53.01	55.80	55.80	▲	77.00
RB 2.023	N/A	N/A	N/A	N/A	M	12:00 PM	71.90	45.60	80.00	53.18	56.00	N/A	N/A	N/A
RB 7.017	LAB 6	8	85	0.3	R	12:30 PM	74.40	30.40	62.00	56.08	59.00	57.70	▲	68.00
RB 5.22	LAB 1	6	480	0.8	W	10:55 AM	70.30	32.10	60.00	55.00	58.10	58.10	▲	50.00
RB 7.021A	LAB 6	4	500	1.2	TU	2:57 PM	71.00	34.50	79.00	53.01	56.50	56.50	▲	73.00
RB 2.011	EQUIP	6	330	0.8	M	1:00 PM	74.90	39.50	81.00	52.96	56.50	56.10	N/A	N/A
RB 3.23	LAB 2	9	700	1.3	TU	10:35 AM	71.20	46.90	74.00	53.12	56.70	56.30	▲	68.00
RB 6.019A	LAB 2	5	210	0.6	R	10:52 AM	74.20	33.00	60.00	56.06	59.70	59.70	59.70	50.00
RB 7.020A	OFF	3	160	0.5	R	2:35 PM	73.00	33.80	61.00	55.95	59.60	59.10	60.00	71.00
RB 4.23	LAB 2	9	700	1.3	TU	2:42 PM	74.80	45.00	79.00	53.01	56.80	56.00	▲	76.00
RB 3.011	EQUIP	6	330	0.8	M	4:25 PM	77.80	39.00	82.00	53.17	57.00	56.10		68.00
RB 4.20	LAB 3	12	1320	2.6	TU	3:10 PM	76.60	39.00	79.00	53.01	57.00	56.90	▲	70.00
RB 5.19A	LAB 2	5	210	0.6	W	10:35 AM	74.00	30.00	59.00	55.00	59.00	59.00	▲	50.00
RB 2.022	LAB 1	6	480	0.8	M	12:15 PM	74.40	42.40	80.00	53.18	57.30	N/A	N/A	N/A
RB 2.020	LAB 3	12	1320	2.6	M	12:55 PM	72.50	44.60	81.00	52.96	57.40	56.80	N/A	N/A
RB 6.018	LAB 2	9	700	1.3	R	11:12 AM	71.60	33.80	60.00	56.06	60.50	58.00	▲	65.00
RB 5.002	KITCHEN	12	1200	2.8	W	11:30 AM	72.00	30.00	62.00	55.00	59.60	56.90	▲	75.00
RB 2.019	LAB 2	9	700	1.3	M	1:05 PM	71.50	44.30	81.00	52.96	57.60	55.90	N/A	N/A
RB 6.020	LAB 3	12	1320	2.6	R	10:38 AM	73.60	31.90	60.00	56.05	60.80	59.00	▲	74.00
RB 7.021B	LAB 6	12	125	0.3	TU	3:05 PM	73.00	36.00	79.00	53.01	58.30	N/A	N/A	N/A
RB 7.010	EQUIP		360	0.8	R	1:47 PM	75.90	30.10	62.00	56.05	62.10	57.40	▲	74.00
RB 3.015	OFF	9	690	1.3	TU	11:05 AM	72.70	43.10	75.00	53.53	60.20	59.00	60.00	72.00

AHU-2

UNIT LOC/SERVES ROOM #	TYPE	SIZE	CFM	GPM	DAY	TIME	RM. TEMP F	ROOM RH	AMBIENT TEMP. F	COLD DECK DISCHARGE TEMP (F)	*AT ORIGINAL* THERMOSTAT SETTING	*AT MINIMUM* THERMOSTAT SETTING (50 F)	*AT MAXIMUM* THERMOSTAT SETTING (86 F)	ORIGINAL THERMOSTAT SETTING (F)
RB 7.017A	EQUIP	5	500	1.2	R	12:45 PM	77.10	29.00	83.00	56.07	63.30	63.30		50.00
RB 5.015	OFF	9	690	1.3	W	2:28 PM	72.60	31.60	66.00	55.51	64.30	59.10		68.00
RB 6.002	KITCHEN	12	1200	2.8	W	3:55 PM	72.00	30.00	68.00	53.47	62.90	54.70		67.00
RB 6.015	OFF	9	690	1.3	W	5:23 PM	70.50	32.40	67.00	55.58	66.00	59.40		63.00
RB 4.015	OFF	9	690	1.3	TU	5:00 PM	74.00	44.00	76.50	53.51	64.00	57.30		71.00
RB 5.18A	LAB 2	5	210	0.6	W	10:28 AM	72.50	32.60	58.00	55.00	65.50	58.20		66.00
RB 5.23A	LAB 2	5	210	0.6	W	1:10 AM	79.20	24.00	60.00	55.00	65.70	56.70		59.00
RB 6.022	LAB 1	6	480	0.8	R	10:25 AM	74.90	30.30	59.00	56.05	67.70	58.50		73.00
RB 5.002	KITCHEN	12	1200	2.8	W	9:25 AM	76.00	30.00	55.00	55.00	67.30	58.50		72.00
RB 5.20	LAB 3	12	1320	2.6	W	10:40 AM	74.80	29.00	59.00	54.00	67.00	54.80		60.00
RB 3.002	LAB	12	1200	2.8	M	4:42 PM	72.00	47.80	82.00	53.17	67.00	55.00		N/A
RB 3.23A	LAB 2	5	210	0.6	TU	10:42 AM	72.00	45.30	74.00	53.12	67.50	N/A		N/A
RB 3.19	LAB 2	9	700	1.3	TU	10:56 AM	75.80	39.80	75.00	53.12	70.70	70.90	70.90	50.00
RB 4.19A	LAB 2	5	210	0.6	TU	3:25 PM	76.00	41.00	79.00	51.01	68.60	56.30		70.00
RB 6.018A	LAB 2	5	210	0.6	R	11:15 AM	71.90	33.40	60.00	56.07	73.70	58.20		72.00
RB 5.23	LAB 2	9	700	1.3	W	11:00 AM	75.60	32.00	60.00	55.00	72.90	70.90		85.00
RB 4.19	LAB 2	9	700	1.3	TU	3:15 PM	76.00	38.00	79.00	53.01	71.00	54.80		86.00
RB 7.017B	OFF	5	160	0.5	R	12:47 PM	77.10	29.20	83.00	56.07	74.30	58.90		68.00
RB 2.016	OFF	N/A	N/A	N/A	M	1:30 PM	76.40	38.90	82.00	52.81	71.60	60.20		74.00
RB 7.018B	OFF	4	150	0.5	R	2:15 PM	73.20	33.80	62.00	56.00	75.00	57.00		84.00
RB 4.23A	LAB 2	5	210	0.6	TU	2:50 PM	77.00	40.00	79.00	53.01	72.40	58.10		78.00
RB 2.018	LAB 2	9	700	1.3	M	1:17 PM	74.30	41.00	81.00	52.96	73.70	57.20		68.00
RB 7.015	LAB 6	9	720	1.3	R	11:40 AM	77.60	29.10	61.00	56.09	79.20	65.20		63.00
RB 7.016B	OFF	4	100	0.3	R	12:05 PM	70.00	35.00	61.00	56.10	80.20	63.30		86.00
RB 4.18A	LAB 2	5	210	0.6	TU	3:40 PM	76.10	39.20	78.00	53.48	79.60	56.70		84.00
RB 6.023A	LAB 2	5	210	0.6	R	10:05 AM	76.20	30.90	59.00	56.04	83.10	68.70		65.00
Average							**73.67**	**36.38**	**68.98**	**54.42**	**62.18**	**57.96**		**66.63**
RB 2.015	OFF	9	690	1.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RB 2.019A	LAB 2	5	210	0.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RB 3.18A	LAB 2	5	210	0.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RB 3.18	LAB 2	9	700	1.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

RB-3															
	UNIT LOC/SERVES	TYPE	SIZE	CFM	GPM	DAY	TIME	RM. TEMP	ROOM	AMBIENT	COLD DECK	DIFFUSION DISCHARGE TEMP (F)			ORIGINAL
	ROOM #							F	RH	TEMP	DISCHARGE	ORIGINAL	MINIMUM	MAXIMUM	THERMOSTAT
										F	TEMP (F)	THERMOSTAT	THERMOSTAT	THERMOSTAT	SETTING (F)
												SETTING	SETTING (50 F)	SETTING (86 F)	
	RB 1.000	CORR													
	RB 1.000A	VESTIBULE				F	11:40	72.5	42.7	68.0	53.60	54.0			
	RB 1.000B	STOR													
	RB 1.001	LIBRARY				F	11:45	77.0		68.0	53.54				
	RB 1.R002	RR				F	11:00	77.0	38.5	66.0	54.28				
	RB 1.003	TELE													
	RB 1.004	ELEC													
	RB 1.R005	RR													
	RB 1.006	JAN													
	RB 1.007	DIRECTOR OFF				F	11:15	74.6	39.4	66.0	54.12	70.5			
	RB 1.008	REFRENCE OFF				F	11:20	71.6	43.0	67.0	54.06	60.5			
	RB 1.008					F	11:2	72.9	40.0	67.0	54.06	65.9			
	RB 1.008A	TECH. SERVICES				F	11:25	71.2	43.0	67.0	54.00	59.2			
	RB 1.009	SECR				F	11:10	73.9	38.3	66.0	54.20	67.4			
	RB 1.009A	LIBRARIAN				F	11:15	73.9	39.9	66.0	54.12	72.0			

AHU-5

DATE:	October 24 to October 28, 1994													
UNIT ID:	RB 5													
											DIFFUSER DISCHARGE TEMP (F)			
UNIT LOC/SERVES	TYPE	SIZE	CFM	GPM	DAY	TIME	RM. TEMP	ROOM	AMBIENT	COLD DECK	ORIGINAL	MINIMUM	MAXIMUM	ORIGINAL
ROOM #							F	RH	TEMP.	DISCHARGE	THERMOSTAT	THEROMSTAT	THERMOSTAT	THERMOSTAT
									F	TEMP (F)	SETTING	SETTING (50 F)	SETTING (86 F)	SETTING (F)
RB 5.039	EQUIP	6	360	0.8	W	9:05 AM	75.4	31.00	54.0	52.00	52.70	52.20		74.00
RB 6.028A	LAB 2	5	210	0.6	R	9:05 AM	70.3	36.00	55.0	53.35	55.20	55.20	55.20	86.00
RB 6.029A	LAB 2	9	700	1.3	R	8:45 AM	67.5	35.00	55.0	53.35	58.60	57.80	58.20	86.00
RB 6.028	LAB 2	9	700	1.3	R	8:55 AM	72.7	36.00	55.0	53.35	73.30	57.70		84.00
RB 6.029	LAB 2	5	210	0.6	R	8:40 AM	73.7	33.50	55.0	53.35	74.30	56.70		80.00
RB 6.026	LAB 3	12	1320	2.6	R	9:15 AM	73.4	33.00	56.0	53.35	60.30	58.00		77.00
RB 6.025	LAB 1	6	480	0.8	R	9:32 AM	70.4	33.90	57.0	54.06	55.00	54.80	70.20	74.00
RB 7.029	OFF	10	900	2.0	F	8:40 AM	73.6	40.50	57.0	52.58	66.10	65.70		75.00
RB 6.024	LAB 2	9	700	1.3	R	9:40 AM	73.5	31.30	58.0	54.06	58.10	58.10		50.00
RB 6.024A	LAB 2	5	210	0.6	R	9:45 AM	76.0	39.00	58.0	54.06	75.00	56.50		70.00
RB 7.035A	LAB	5	220	0.5	F	9:30 AM	74.9	43.00	60.0	51.90	57.70	57.70		50.00
RB 7.035K	LAB	5	270	0.5	F	9:35 AM	75.7	37.00	60.0	51.70	57.60	57.60	58.00	65.00
RB 7.024	LAB 6	8	125	0.3	R	3:10 PM	73.5	34.20	61.0	54.41	57.30	57.30		69.00
RB 7.024B	OFF	5	215	0.5	R	3:15 PM	70.2	40.00	61.0	54.41	58.10	55.00		63.00
RB 7.025B	LAB 6	4	85	0.3	R	3:50 PM	72.1	35.00	61.0	54.63	59.00	56.00		76.00
RB 7.026A	LAB 6	5	160	0.5	R	4:27 PM	75.2	30.90	61.0	54.88	59.90	58.30		70.00
RB 7.027B	LAB 6	4	85	0.3	R	5:10 PM	73.1	34.70	61.0	55.04	60.80	59.90		70.00
RB 7.028A	LAB 6	4	100	0.3	R	5:52 PM	71.5	38.00	61.0	54.96	60.80	60.60	60.60	83.00
RB 7.025	LAB 6	8	500	1.2	R	3:40 PM	72.4	36.00	61.0	54.60	60.80	59.80		73.00
RB 7.025A	LAB 6	5	160	0.5	R	3:30 PM	72.1	34.00	61.0	54.50	61.00	57.50	59.90	73.00
RB 7.026B	LAB 6	5	215	0.5	R	4:07 PM	76.0	33.00	61.0	54.70	63.70	60.50		75.00
RB 7.027A	LAB 6	5	160	0.5	R	5:20 PM	74.0	34.00	61.0	55.01	66.00	58.10		76.00
RB 7.028	LAB 6	8	500	1.2	R	5:24 PM	74.2	33.50	61.0	55.04	68.50	67.30		70.00
RB 7.028B	LAB 6	7	450	1.0	R	5:40 PM	72.6	35.20	61.0	54.96	68.50	58.70		75.00
RB 7.027	LAB 6	8	500	1.2	R	4:48 PM	74.5	32.00	61.0	54.04	69.40	60.00		70.00
RB 7.026	LAB 6	8	500	1.2	R	4:10 PM	76.7	30.00	61.0	54.73	75.70	60.50		61.00
RB 7.024A	OFF	4	500	1.2	R	3:20 PM	74.1	33.90	61.0	54.41	76.50	60.70		76.00
RB 5.024	LAB 2	9	700	1.3	W	11:37 AM	74.5	29.70	62.0	53.00	72.80	62.70		75.00
RB 5.025	LAB 1	6	480	0.8	W	12:15 PM	74.7	30.00	63.0	53.00	54.70	54.70		50.00
RB 5.026	LAB 3	12	1320	2.6	W	12:18 PM	70.7	32.40	63.0	53.00	55.50	55.10		67.00
RB 7.035J	LAB	5	220	0.5	F	10:05 AM	75.5	37.00	63.0	50.24	54.20	54.20		50.00
RB 5.024A	LAB 2	5	210	0.6	W	11:45 AM	75.6	28.70	63.0	53.00	74.10	55.50		85.00
RB 5.030	OFF	10	870	1.8	W	12:38 PM	73.4	29.20	64.0	53.00	59.20	55.50		70.00
RB 5.028	LAB 2	9	700	1.3	W	12:28 PM	76.6	26.70	64.0	53.00	74.00	58.10		77.00
RB 5.029A	LAB 2	9	700	1.3	W	12:58 PM	73.5	29.50	65.0	53.00	57.10	57.10		72.00

AHU-5

											DIFFUSER DISCHARGE TEMP (F)			
UNIT LOC/SERVES	TYPE	SIZE	CFM	GPM	DAY	TIME	RM. TEMP	ROOM	AMBIENT	COLD DECK	ORIGINAL	MINIMUM	MAXIMUM	ORIGINAL
ROOM #							F	RH	TEMP.	DISCHARGE	THERMOSTAT	THEROMSTAT	THERMOSTAT	THERMOSTAT
									F	TEMP (F)	SETTING	SETTING (50 F)	SETTING (86 F)	SETTING (F)
RB 5.029	LAB 2	5	210	0.6	W	12:55 PM	74.6	29.00	65.0	53.00	72.40	58.00		77.00
RB 6.039	EQUIP	6	360	0.8	W	4:30 PM	72.3	31.20	68.0	52.55	54.10	54.10		59.00
RB 6.030	OFF	10	870	1.8	W	5:12 PM	72.2	29.80	68.0	52.55	58.30	55.50		61.00
RB 3.039	EQUIP	6	360	0.8	TU	8:53 AM	77.7	37.00	70.0	50.49	55.10	53.70		72.00
RB 3.032	OFF				TU	9:25 AM	74.0	41.00	71.0	50.49	69.70	N/A	N/A	N/A
RB 3.031	OFF				TU	9:30 AM	73.3	41.00	71.0	50.49	69.70	N/A	N/A	N/A
RB 3.030	OFF	10	870	1.8	TU	9:30 AM	73.7	41.00	71.0	50.49	69.70	55.70		61.00
RB 3.029	LAB 2	5	210	0.6	TU	9:35 AM	72.9	41.00	71.0	50.74	72.50	55.60		71.00
RB 3.025	LAB 1	6	480	0.8	TU	10:15 AM	73.0	43.20	72.0	50.74	53.30	N/A	N/A	N/A
RB 3.028	LAB 2	9	700	1.3	TU	9:45 AM	71.6	44.20	72.0	50.74	54.10	53.80		50.00
RB 3.026	LAB 3	12	1320	2.6	TU	10:06 AM	71.8	44.00	72.0	50.74	63.50	64.30		50.00
RB 3.028A	LAB 2	5	210	0.6	TU	9:55 AM	74.4	40.00	72.0	50.74	82.40	54.80		80.00
RB 3.024	LAB 2	9	700	1.3	TU	10:20 AM	71.6	42.50	73.0	50.74	65.70	65.70		64.00
RB 3.024A	LAB 2	5	210	0.6	TU	10:25 AM	73.0	41.40	73.0	50.74	69.70	55.50		77.00
RB 3.29A	LAB 2	9	700	1.3	TU	11:38 AM	72.2	43.40	76.0	51.26	54.80	54.40	54.50	83.00
RB 2.039	EQUIP	6	360	0.8	M	10:49 AM	74.8	45.00	76.0	52.99	67.40	N/A	N/A	N/A
RB 2.030	OFF	10	870	1.8	M	11:20 AM	69.0	51.20	78.0	52.99	55.20	N/A	N/A	N/A
RB 2.029A	LAB 2	5	210	0.6	M	11:23 AM	72.0	47.00	78.0	52.99	57.20	N/A	N/A	N/A
RB 4.039	EQUIP	6	360	0.8	TU	12:56 PM	77.6	36.70	78.0	51.04	61.00	N/A		50.00
RB 4.025	LAB 1	6	480	0.8	TU	2:20 PM	73.0	43.70	79.0	50.97	53.90	53.90		50.00
RB 4.028	LAB 2	9	700	1.3	TU	2:00 PM	75.6	40.30	79.0	50.97	57.70	58.10		71.00
RB 4.029	LAB 2	5	210	0.6	TU	1:44 PM	75.4	39.80	79.0	50.97	58.00	57.70		68.00
RB 4.024A	LAB 2	5	210	0.6	TU	2:31 PM	74.0	40.20	79.0	51.15	63.40	55.00		77.00
RB 4.026	LAB 3	12	1320	2.6	TU	2:12 PM	73.3	41.50	79.0	50.97	65.10	56.90		74.00
RB 4.030	OFF	10	870	1.8	TU	1:37 PM	76.5	39.00	79.0	50.97	68.40	N/A	N/A	N/A
RB 4.029A	LAB 2	9	700	1.3	TU	1:45 PM	75.3	38.40	79.0	50.97	68.60	56.80		70.00
RB 2.028	LAB 2	9	700	1.3	M	11:29 AM	75.9	40.40	79.0	52.99	72.40	N/A	N/A	N/A
RB 4.024	LAB 2	9	700	1.3	TU	2:30 PM	73.3	41.70	79.0	51.05	77.40	56.50		76.00
RB 2.028A	LAB 2	5	210	0.6	M	11:33 AM	77.7	40.10	79.0	52.69	80.40	N/A	N/A	N/A
RB 2.025	LAB 1	6	480	0.8	M	11:45 AM	71.4	47.60	80.0	52.69	56.90	N/A	N/A	N/A
RB 2.002	LAB	N/A	N/A	N/A	M	11:55 AM	73.2	43.00	80.0	52.69	67.00	N/A	N/A	N/A
RB 2.026	LAB 3	12	1320	2.6	M	11:40 AM	73.1	42.70	80.0	52.69	67.50	N/A	N/A	N/A
RB 2.024	LAB 2	9	700	1.3	M	11:50 AM	73.5	45.00	80.0	52.69	75.00	N/A	N/A	N/A
Average							**73.63**	**37.35**	**67.46**	**52.64**	**63.96**	**57.54**		**69.78**
RB 2.024A	LAB 2	5	210	0.6	N/A	N/A	N/A	42.00	N/A	N/A	N/A	N/A	N/A	N/A
RB 2.029	LAB 2	9	700	1.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

AHU-5

											DIFFUSER DISCHARGE TEMP (F)			
UNIT LOC/SERVES	TYPE	SIZE	CFM	GPM	DAY	TIMF	RM. TEMP	ROOM	AMBIENT	COLD DECK	ORIGINAL	MINIMUM	MAXIMUM	ORIGINAL
ROOM #							F	RH	TEMP.	DISCHARGE	THERMOSTAT	THEROMSTAT	THERMOSTAT	THERMOSTAT
									F	TEMP (F)	SETTING	SETTING (50 F)	SETTING (86 F)	SETTING (F)
RB 2.H000D	COR	10	850	1.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RB 3.H000D	COR	10	850	1.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RB 4.H000D	COR	10	850	1.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RB 4.028A	LAB 2	5	210	0.6	TU	2:05 PM	76.4	37.40	79.0	50.97	N/A	N/A	N/A	50.00
RB 5.H00D	COR	10	850	1.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RB 5.028A	LAB 2	5	210	0.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RB 6.H00D	COR	10	850	1.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RB 7.032	STORAGE	N/A	N/A	N/A	N/A	N/A	N/A	40.00	N/A	N/A	61.50	N/A	N/A	N/A
RB 7.H000E	COR	7	470	1.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RB H00D	COR	12	1205	2.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Appendix B: Summary of System Failure Diagnosis

The third column indicates the room types: either interior or exterior zone. The room air temperature and its relative humidity were measured by hand-held meter by ESL staff. The ambient temperature was measured by the LoanSTAR sensor located in Hobby airport, Houston. The cold deck discharge air temperature was measured by the EMCS at the MDA. The diffuser discharge air temperature was measured by ESL staff.

The reheat was determined as the difference between the diffuser discharge air temperature and the cold deck discharge air temperature.

The leakage was defined as the difference between the minimum diffuser discharge air temperature (when the thermostat is located the lowest position) and the cold deck discharge air temperature.

The air flow rate adjustment was determined by the following formula:

$$\beta = 1 - \frac{T_{room} - T_{diffuser}^{ave}}{T_{room} - T_{diffuser}}$$

Where β is the air flow reduction fraction (if it is positive the air flow should be increased otherwise the air flow rate should be decreased); T_{room} is the room air temperature; $T_{diffuser}$ is the diffuser discharge air temperature; and the $T_{diffuser}^{ave}$ is the average diffuser discharge air temperature for the AHU.

Note that the air flow correct formula was deduced based upon the same load ratio for each room. This assumption is considered correct for this building due to (1) most of the rooms are exterior room and have similar internal and exterior load and (2) the tests were performed under the similar weather conditions.

The repair measure was determined by the following rules: if the leakage is lower than 3 °F, then, repair is suggested.

AHU-1

DATE:	October 24 to October 28, 1994										
UNIT ID: RB1	RB 1										
UNIT LOC/SERVES ROOM #	TYPE	*EXT/INT*	RM. TEMP F	ROOM RH	AMBIENT TEMP. F	COLD DECK DISCHARGE TEMP (F)	*DIFFUSER* DISCHARGE TEMP (F)	REHEAT F	LEAKAGE F	% AIR REDUCTION/ INCREASE	REPAIR MEASURE
RB 7.033	CONF	Ext	72.6	40.60	57.0	58.76	69.9	11.14	7.0	-50%	Repair Steam Valve & Damper
RB 7.035	WORK AREA	Ext	76.0	37.00	61.0	58.80	60.1	1.30	1.3	28%	No Repairs are Needed
RB 7.008	LAB 7	Ext	76.1	32.20	61.0	58.35	75.0	16.65	17.3	-50%	Repair Thermostat & Steam Valve
RB 7.035F	LAB	Ext	77.0	38.00	62.0	58.79	62.5	3.71	4.2	14%	Repair Thermostat & Steam Valve
RB 7.035E	LAB	Ext	77.0	35.00	62.0	58.79	71.6	12.81	1.7	-50%	No Repairs are Needed
RB 7.035B	LAB	Ext	76.6	35.80	63.0	58.40	58.5	0.10	0.1	34%	No Repairs are Needed
RB 7.035G	LAB	Ext	75.3	38.00	63.0	58.79	64.8	6.01	2.2	-2%	No Repairs are Needed
RB 7.007	DARK	Ext	73.5	36.50	64.0	58.32	60.0	1.68	1.7	34%	No Repairs are Needed
RB 7.008	LAB 7	Ext	76.7	37.30	64.0	58.79	74.7	15.91	4.6	-50%	Repair Steam Valve & Damper
RB 7.012	CHEMICAL RM	Ext	72.0	37.00	65.0	58.78	61.5	2.72	2.7	30%	No Repairs are Needed
RB 7.008D	LAB	Ext	76.8	36.00	65.0	58.78	63.9	5.12	4.3	5%	Repair Steam Valve & Damper
RB 5.033	LAB	Ext	73.2	31.40	65.0	56.00	62.0	6.00	6.0	23%	Repair Steam Valve & Damper
RB 5.035	CONF	Ext	78.1	26.00	65.0	56.00	76.0	20.00	6.2	-50%	Repair Steam Valve & Damper
RB 6.033A	OFF	Ext	75.1	29.60	66.0	59.04	63.5	4.46	1.6	9%	No Repairs are Needed
RB 5.033A	OFF	Ext	75.3	30.00	66.0	56.85	65.2	8.35	2.2	-6%	No Repairs are Needed
RB 6.008	LAB 4	Ext	77.0	26.00	67.0	58.20	58.2	0.00	0.0	34%	No Repairs are Needed
RB 6.013	LAB	Ext	77.7	28.00	67.0	57.43	59.2	1.77	1.8	29%	No Repairs are Needed
RB 6.012	LAB	Ext	76.0	28.40	67.0	57.43	62.2	4.77	3.8	17%	Repair Steam Valve & Damper
RB 6.014	EQUIP	Ext	76.1	28.00	67.0	57.43	63.1	5.67	4.6	12%	Repair Thermostat & Steam Valve
RB 6.033	LAB	Ext	74.5	29.70	67.0	59.04	70.0	10.96	10.8	-50%	Repair Steam Valve & Damper
RB 6.009	LAB	Ext	77.3	27.00	67.0	57.43	69.8	12.37	10.7	-50%	Repair Steam Valve & Damper
RB 6.040	OFF	Ext	72.3	30.00	68.0	59.28	60.5	1.22	0.7	35%	No Repairs are Needed
RB 6.007	OFF	Ext	76.6	30.00	68.0	59.28	67.0	7.72	0.7	-25%	Repair Steam Valve & Damper
RB 6.040A	OFF	Ext	76.5	28.80	68.0	58.13	66.0	7.87	6.3	-13%	Repair Steam Valve & Damper
RB 6.035	CONF	Ext	75.0	28.90	68.0	58.13	71.7	13.57	7.5	-50%	Repair Steam Valve & Damper
RB 3.033	LAB 5	Ext	74.9	44.80	70.0	54.71	64.4	9.69	9.7	2%	Repair Steam Valve & Damper
RB 3.040	OFF	Ext	78.8	41.90	70.0	54.71	65.3	10.59	10.6	-5%	Repair Thermostat & Steam Valve
RB 3.035	CONF	Ext	76.5	44.80	70.0	54.71	75.5	20.79	4.2	-50%	Repair Steam Valve & Damper
RB 3.007	DARK	Ext	73.4	48.70	75.0	52.83	58.6	5.77	5.2	41%	Repair Steam Valve & Damper
RB 3.R001	RR	Ext	75.7	50.20	75.0	52.83	74.0	21.17	N/A	-50%	No Repairs are Needed
RB 2.032	OFF	Ext	71.7	48.10	77.0	55.81	58.1	2.29	-0.3	48%	No Repairs are Needed
RB 2.031	OFF	Ext	69.9	49.90	77.0	54.27	56.7	2.43	N/A	60%	No Repairs are Needed
RB 2.040	OFF	Ext	70.5	51.40	77.0	54.27	59.0	4.73	N/A	49%	Check Terminal Box
RB 2.033A	OFF	Ext	73.2	46.50	77.0	54.27	65.0	10.73	N/A	-5%	Check Terminal Box
RB 2.033	LAB	Ext	74.5	44.00	77.0	54.27	65.3	11.03	N/A	-8%	Check Terminal Box
RB 2.040A	OFF	Ext	72.0	50.00	77.0	54.27	66.5	12.23	N/A	-35%	Check Terminal Box
RB 2.O35	CONF	Ext	75.2	46.70	77.0	54.27	69.1	14.83	N/A	-50%	Check Terminal Box
RB 3.033A	OFF	Ext	72.7	47.30	77.0	55.31	70.9	15.59	4.5	-50%	Repair Steam Valve & Damper
RB 4.012	EQUIP	Ext	75.0	45.00	78.0	54.89	58.3	3.41	3.4	38%	Repair Thermostat & Steam Valve
RB 4.040	OFF	Ext	71.0	44.60	78.0	55.23	59.1	3.87	3.9	46%	Repair Steam Valve & Damper

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UNIT LOC/SERVES ROOM #	TYPE	*EXT/INT*	RM. TEMP F	ROOM RH	AMBIENT TEMP. F	COLD DECK DISCHARGE TEMP (F)	*DIFFUSER* DISCHARGE TEMP (F)	REHEAT F	LEAKAGE F	% AIR REDUCTION/ INCREASE	REPAIR MEASURE
RB 7.033	CONF	Ext	72.6	40.60	57.0	58.76	69.9	11.14	7.0	-50%	Repair Steam Valve & Damper
RB 7.035	WORK AREA	Ext	76.0	37.00	61.0	58.80	60.1	1.30	1.3	28%	No Repairs are Needed
RB 7.008	LAB 7	Ext	76.1	32.20	61.0	58.35	75.0	16.65	17.3	-50%	Repair Thermostat & Steam Valve
RB 4.014	LAB	Ext	74.2	44.00	78.0	54.89	61.5	6.61	4.6	24%	Repair Steam Valve & Damper
RB 4.013	LAB	Ext	76.2	44.00	78.0	54.89	68.6	13.71	3.8	-50%	Repair Steam Valve & Damper
RB 4.033	LAB	Ext	74.5	44.40	78.0	55.23	69.7	14.47	6.0	-50%	Repair Steam Valve & Damper
RB 4.035	CONF	Ext	76.8	43.50	78.0	55.23	70.4	15.17	3.7	-50%	Repair Steam Valve & Damper
RB 4.033A	OFF	Ext	73.0	47.50	79.0	54.84	66.4	11.56	3.5	-27%	Repair Steam Valve & Damper
RB 2.008	LAB 4	Ext	72.4	46.00	80.0	54.10	58.0	3.90	N/A	46%	No Repairs are Needed
RB 3.012	LAB	Ext	70.6	50.00	82.0	54.25	58.0	3.75	3.8	52%	Repair Steam Valve & Damper
RB 3.008	LAB 4	Ext	76.2	42.30	82.0	54.25	58.0	3.75	3.8	36%	Repair Steam Valve & Damper
RB 3.013	LAB	Ext	73.3	46.70	82.0	54.25	59.1	4.85	4.9	39%	Repair Thermostat & Steam Valve
RB 3.O14	LAB	Ext	76.3	46.10	82.0	54.25	64.7	10.45	6.3	-1%	Repair Steam Valve & Damper
RB 2.013	LAB	Ext	71.6	48.20	83.0	54.19	57.0	2.81	2.8	52%	Repair Thermostat & Steam Valve
RB 2.012	LAB	Ext	73.4	46.70	83.0	54.19	58.5	4.31	4.3	41%	Repair Thermostat & Steam Valve
RB 2.014	EQUIP	Ext	73.0	45.00	83.0	54.19	61.7	7.51	5.6	26%	Repair Steam Valve & Damper
RB 5.013	LAB	Ext	70.3	37.20	57.0	54.00	64.0	10.00	n/a	10%	Check Terminal Box
RB 5.014	LAB	Ext	74.5	33.00	57.0	54.00	70.4	16.40	10.3	-50%	Repair Steam Valve & Damper
RB 5.040	OFF	Ext	75.2	32.70	54.0	54.00	73.4	19.40	1.4	-50%	No Repairs are Needed
RB 5.040A	OFF	Ext	73.9	34.60	54.0	54.00	72.9	18.90	0.1	-50%	No Repairs are Needed
RB 5.008	LAB 4	Ext	71.5	36.00	56.0	54.00	54.3	0.30	0.1	60%	No Repairs are Needed
RB 7.034	OFF	Int	72.7	36.00	54.0	58.46	68.1	9.64	9.6	-50%	Repair Thermostat & Steam Valve
RB 7.034A	OFF	Int	74.0	44.00	57.0	58.82	73.0	14.18	4.0	-50%	Repair Steam Valve & Damper
RB 7.034B	OFF	Int	70.6	43.60	58.0	58.82	62.4	3.58	3.5	27%	Repair Steam Valve & Damper
RB 7.011	LAB	Int	75.3	36.60	66.0	58.77	62.2	3.43	2.3	18%	No Repairs are Needed
RB 6.034	DARK	Int	69.6	34.00	68.0	58.13	59.0	0.87	0.1	53%	Repair Thermostat & Steam Valve
RB 3.036	EQUIP	Int	78.7	41.30	70.0	54.71	62.5	7.79	5.5	13%	Repair Steam Valve & Damper
RB 3.034	DARK	Int	74.3	49.40	78.0	55.31	60.8	5.49	5.5	28%	Repair Steam Valve & Damper
RB 4.034	DARK	Int	76.3	42.60	78.0	55.23	72.4	17.17	5.0	-50%	Repair Steam Valve & Damper
RB 3.009	EQUIP	Int	76.9	43.00	82.0	54.25	67.2	12.95	6.8	-27%	Repair Steam Valve & Damper
RB 2.009	EQUIP	Int	71.4	51.10	83.0	55.07	58.5	3.43	3.1	47%	Repair Steam Valve & Damper
RB 2.036	EQUIP	Int	71.0	51.00	83.0	54.19	62.4	8.21	8.2	26%	Repair Thermostat & Steam Valve
RB 5.012	EQUIP	Int	73.1	34.10	57.0	54.00	69.9	15.90	3.0	-50%	No Repairs are Needed
RB 5.009	EQUIP	Int	72.8	32.70	56.0	54.00	66.6	12.60	0.0	-32%	No Repairs are Needed
RB 5.036	EQUIP	Int	74.1	39.50	54.0	54.00	55.6	1.60	0.6	49%	No Repairs are Needed
RB 5.034	DARK	Int	71.2	38.70	54.0	54.00	65.5	11.50	0.8	-16%	No Repairs are Needed
Average			74.30	39.65	69.55	56.00	64.59	8.59			
RB 2.007	DARK		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No Repairs are Needed
RB 2.R005	RR		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No Repairs are Needed
RB 2.H00A	COR		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No Repairs are Needed
RB 2.034	DARK		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Check Terminal Box

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UNIT LOC/SERVES	TYPE	*EXT/INT*	RM. TEMP	ROOM	AMBIENT	COLD DECK	*DIFFUSER*	REHEAT	LEAKAGE	% AIR	REPAIR MEASURE
ROOM #			F	RH	TEMP.	DISCHARGE	DISCHARGE	F	F	REDUCTION/	
					F	TEMP (F)	TEMP (F)			INCREASE	
RB 7.033	CONF	Ext	72.6	40.60	57.0	58.76	69.9	11.14	7.0	-50%	Repair Steam Valve & Damper
RB 7.035	WORK AREA	Ext	76.0	37.00	61.0	58.80	60.1	1.30	1.3	28%	No Repairs are Needed
RB 7.008	LAB 7	Ext	76.1	32.20	61.0	58.35	75.0	16.65	17.3	-50%	Repair Thermostat & Steam Valve
RB 3.H000A	COR		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No Repairs are Needed
RB 3.040A	OFF		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No Repairs are Needed
RB 4.009	EQUIP		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No Repairs are Needed
RB 4.007	DARK		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No Repairs are Needed
RB 4.R005	RR		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No Repairs are Needed
RB 4.H00A	COR		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No Repairs are Needed
RB 4.040A	OFF		N/A	N/A		N/A	N/A	N/A	N/A	N/A	Check Terminal Box
RB 4.036	EQUIP		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Check Terminal Box
RB 4.008	LAB 4		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Check Terminal Box
RB 5.007	DARK		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Check Terminal Box
RB 5.R005	RR		75.5	33.30	55.0	54.00	75.7	N/A	N/A		No Repairs are Needed
RB 5.H00A	COR		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No Repairs are Needed
RB 6.R005	RR		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No Repairs are Needed
RB 6.H00A	COR		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No Repairs are Needed
RB 6.036	EQUIP		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Check Terminal Box
RB 7.008A	STOR		75.1	38.00	65.0	58.78	N/A	N/A	N/A	N/A	No Repairs are Needed
RB 7.004	RR		76.0	40.00	61.0	58.80	N/A	N/A	N/A	N/A	No Repairs are Needed
RB 7.H00A	COR		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No Repairs are Needed

DATE:	October 24 to October 28, 1994										
UNIT ID:	RB 2										
UNIT LOC/SERVES ROOM #	TYPE	INT/EXT	RM. TEMP F	ROOM RH	AMBIENT TEMP. F	COLD DECK DISCHARGE TEMP (F)	DIFFUSER DISCHARGE TEMP (F)	REHEAT F	LEAKAGE F	% AIR REDUCTION/ INCREASE	REPAIR MEASURE
RB 5.18	LAB 2	EXT	72.70	31.40	57.00	55.00	57.20	2.20	1.00	44%	No Repaires are Needed
RB 5.18A	LAB 2	EXT	72.50	32.80	58.00	55.00	65.50	10.50	3.20	-21%	No Repaires are Needed
RB 5.19	LAB 2	EXT	73.50	31.00	59.00	55.00	56.50	1.50	1.50	44%	No Repaires are Needed
RB 6.023	LAB 2	EXT	73.60	32.00	59.00	56.04	58.00	1.96	1.76	38%	No Repaires are Needed
RB 5.19A	LAB 2	EXT	74.00	30.00	59.00	55.00	59.00	4.00	4.00	33%	No Repaires are Needed
RB 6.022	LAB 1	EXT	74.90	30.30	59.00	56.05	67.70	11.65	2.45	-51%	No Repaires are Needed
RB 5.20	LAB 3	EXT	74.80	29.00	59.00	54.00	67.00	13.00	0.80	-38%	No Repaires are Needed
RB 6.023A	LAB 2	EXT	76.20	30.90	59.00	56.04	83.10	27.06	12.66	n/a	Repair Steam Valve & Damper
RB 6.019	LAB 2	EXT	74.00	33.00	60.00	56.06	57.60	1.54	1.54	39%	No Repaires are Needed
RB 5.22	LAB 1	EXT	70.30	32.10	60.00	55.00	58.10	3.10	3.10	48%	No Repaires are Needed
RB 6.019A	LAB 2	EXT	74.20	33.00	60.00	56.06	59.70	3.64	3.64	30%	Repair Thermostat & Steam Valve
RB 6.018	LAB 2	EXT	71.60	33.80	60.00	56.06	60.50	4.44	1.94	32%	No Repaires are Needed
RB 6.020	LAB 3	EXT	73.60	31.90	60.00	56.05	60.80	4.75	2.95	25%	No Repaires are Needed
RB 5.23A	LAB 2	EXT	79.20	24.00	60.00	55.00	65.70	10.70	1.70	-13%	No Repaires are Needed
RB 6.018A	LAB 2	EXT	71.90	33.40	60.00	56.07	73.70	17.63	2.13	n/a	No Repaires are Needed
RB 5.23	LAB 2	EXT	75.60	32.00	60.00	55.00	72.90	17.90	15.90	-50%	Repair Steam Valve & Damper
RB 7.016A	OFF	EXT	67.10	37.80	61.00	55.90	55.90	0.00	0.00	72%	No Repaires are Needed
RB 7.018A	OFF	EXT	71.30	33.50	61.00	55.60	55.60	0.00	0.00	54%	Repair Thermostat
RB 7.016	LAB 6	EXT	69.90	35.60	61.00	56.10	56.40	0.30	0.30	56%	No Repaires are Needed
RB 7.020	LAB 6	EXT	72.60	35.00	61.00	55.96	57.70	1.74	1.54	42%	No Repaires are Needed
RB 7.020B	OFF	EXT	72.60	38.00	61.00	55.95	58.50	2.55	2.55	39%	Repair Thermostat
RB 7.020A	OFF	EXT	73.00	33.80	61.00	55.95	59.60	3.65	3.15	33%	Repair Thermostat & Steam Valve
RB 7.015	LAB 6	EXT	77.60	29.10	61.00	56.09	79.20	23.11	9.11	n/a	Repair Steam Valve & Damper
RB 7.016B	OFF	EXT	70.00	35.00	61.00	56.10	80.20	24.10	7.20	n/a	Repair Steam Valve & Damper
RB 7.018	LAB 6	EXT	73.80	31.90	62.00	56.01	57.00	0.99	-0.01	42%	No Repaires are Needed
RB 7.017	LAB 6	EXT	74.40	30.40	62.00	56.08	59.00	2.92	1.62	32%	No Repaires are Needed
RB 7.018B	OFF	EXT	73.20	33.80	62.00	56.00	75.00	19.00	1.00	n/a	No Repaires are Needed
RB 7.017A	EQUIP	EXT	77.10	29.00	63.00	56.07	63.30	7.23	7.23	5%	Repair Steam Valve & Damper
RB 7.017B	OFF	EXT	77.10	29.20	63.00	56.07	74.30	18.23	2.83	n/a	No Repaires are Needed
RB 5.015	OFF	EXT	72.60	31.60	66.00	55.51	64.30	8.79	3.59	-4%	Repair Steam Valve & Damper
RB 6.015	OFF	EXT	70.50	32.40	67.00	55.58	66.00	10.42	3.82	-44%	Repair Steam Valve & Damper
RB 6.002	KITCHEN	EXT	72.00	30.00	68.00	53.47	62.90	9.43	1.23	-24%	No Repaires are Needed
RB 3.22	LAB 1	EXT	74.50	42.90	74.00	53.12	55.20	2.08	N/A	28%	Check Terminal Box
RB 3.23	LAB 2	EXT	71.20	46.90	74.00	53.12	56.70	3.58	3.18	28%	Repair Steam Valve & Damper
RB 3.23A	LAB 2	EXT	72.00	45.30	74.00	53.12	67.50	14.38	N/A	-50%	Check Terminal Box
RB 3.19A	LAB 2	EXT	72.80	43.70	75.00	53.12	55.40	2.28	2.28	30%	No Repaires are Needed
RB 3.20	LAB 3	EXT	74.10	41.20	75.00	53.12	55.80	2.68	2.68	27%	No Repaires are Needed
RB 3.015	OFF	EXT	72.70	43.10	75.00	53.53	60.20	6.67	5.47	4%	Repair Thermostat & Steam Valve
RB 3.19	LAB 2	EXT	75.80	39.80	75.00	53.12	70.70	17.58	17.78	-50%	Repair Thermostat & Steam Valve
RB 4.015	OFF	EXT	74.00	44.00	76.50	53.51	64.00	10.49	3.79	-33%	Repair Steam Valve & Damper

AHU-2

UNIT LOC/SERVES ROOM #	TYPE	*INT/EXT*	RM. TEMP F	ROOM RH	AMBIENT TEMP. F	COLD DECK DISCHARGE TEMP (F)	DIFFUSER DISCHARGE TEMP (F)	REHEAT F	LEAKAGE F	% AIR REDUCTION/ INCREASE	REPAIR MEASURE
RB 4.18	LAB 2	EXT	74.30	40.00	78.00	53.48	55.40	1.92	1.32	28%	Repair Thermostat
RB 4.18A	LAB 2	EXT	76.10	39.20	78.00	53.48	79.60	26.12	3.22	n/a	Repair Steam Valve & Damper
RB 4.002	KITCHEN	EXT	70.60	45.00	79.00	53.01	54.10	1.09	1.09	40%	No Repairs are Needed
RB 7.006	KITCHEN	EXT	72.90	35.00	79.00	53.01	55.60	2.59	2.09	29%	No Repairs are Needed
RB 4.22	LAB 1	EXT	75.60	39.00	79.00	53.01	55.80	2.79	2.79	25%	No Repairs are Needed
RB 4.23	LAB 2	EXT	74.80	45.00	79.00	53.01	56.80	3.79	2.99	22%	No Repairs are Needed
RB 4.20	LAB 3	EXT	76.60	39.00	79.00	53.01	57.00	3.99	3.89	19%	Repair Steam Valve & Damper
RB 4.19A	LAB 2	EXT	76.00	41.00	79.00	51.01	68.60	17.59	5.29	-50%	Repair Steam Valve & Damper
RB 4.19	LAB 2	EXT	76.00	38.00	79.00	53.01	71.00	17.99	1.79	-50%	No Repairs are Needed
RB 4.23A	LAB 2	EXT	77.00	40.00	79.00	53.01	72.40	19.39	5.09	-50%	Repair Steam Valve & Damper
RB 2.023A	LAB 2	EXT	71.40	45.80	80.00	53.18	54.30	1.12	N/A	37%	Check Terminal Box
RB 2.023	N/A	EXT	71.90	45.60	80.00	53.18	56.00	2.82	N/A	30%	Check Terminal Box
RB 2.022	LAB 1	EXT	74.40	42.40	80.00	53.18	57.30	4.12	N/A	20%	Check Terminal Box
RB 2.018A	LAB 2	EXT	70.70	46.00	81.00	52.96	54.30	1.34	5.34	39%	Repair Thermostat & Steam Valve
RB 2.020	LAB 3	EXT	72.50	44.60	81.00	52.96	57.40	4.44	3.84	22%	Repair Thermostat & Steam Valve
RB 2.019	LAB 2	EXT	71.50	44.30	81.00	52.96	57.60	4.64	2.94	22%	Repair Thermostat & Steam Valve
RB 2.018	LAB 2	EXT	74.30	41.00	81.00	52.96	73.70	20.74	4.24	-50%	Repair Steam Valve & Damper
RB 2.016	OFF	EXT	76.40	38.90	82.00	52.81	71.60	18.79	7.39	-50%	Repair Steam Valve & Damper
RB 5.002	KITCHEN	INT	76.00	30.00	55.00	55.00	67.30	12.30	3.50	-76%	Repair Steam Valve & Damper
RB 5.011	EQUIP	INT	65.40	36.50	57.00	55.00	57.00	2.00	2.00	44%	No Repairs are Needed
RB 7.021	LAB 6	INT	73.60	34.00	61.00	55.85	56.50	0.65	0.65	25%	Repair Thermostat
RB 5.002	KITCHEN	INT	72.00	30.00	62.00	55.00	59.60	4.60	1.90	9%	No Repairs are Needed
RB 7.010	EQUIP	INT	75.90	30.10	62.00	56.05	62.10	6.05	1.35	-10%	No Repairs are Needed
RB 6.011	EQUIP	INT	80.50	27.00	67.00	55.54	57.70	2.16	2.16	13%	No Repairs are Needed
RB 4.011	EQUIP	INT	77.00	39.00	79.00	53.01	55.00	1.99	1.99	26%	No Repairs are Needed
RB 7.021A	LAB 6	INT	71.00	34.50	79.00	53.01	56.50	3.49	3.49	29%	Repair Steam Valve & Damper
RB 7.021B	LAB 6	INT	73.00	36.00	79.00	53.01	58.30	5.29	N/A	16%	Check Terminal Box
RB 2.011	EQUIP	INT	74.90	39.50	81.00	52.96	56.50	3.54	3.14	23%	Repair Thermostat & Steam Valve
RB 3.011	EQUIP	INT	77.80	39.00	82.00	53.17	57.00	3.83	2.93	18%	No Repairs are Needed
RB 3.002	LAB	INT	72.00	47.80	82.00	53.17	67.00	13.83	1.83	-50%	No Repairs are Needed
Average			**73.68**	**36.46**	**69.15**	**54.41**	**62.25**	**7.83**	**3.46**		
RB 2.015	OFF		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Check Terminal Box
RB 2.019A	LAB 2		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Check Terminal Box
RB 3.18A	LAB 2		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RB 3.18	LAB 2		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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DATE:	October 24 to October 28, 1994										
UNIT ID: RB-5	RB 5										
UNIT LOC/SERVES ROOM #	TYPE	INT/EXT	RM. TEMP F	ROOM RH	AMBIENT TEMP. F	COLD DECK DISCHARGE TEMP (F)	DIFFUSER DISCHARGE TEMP (F)	REHEAT F	LEAKAGE F	% AIR REDUCTION/ INCREASE	REPAIR MEASURE
RB 6.028A	LAB 2	Ext	70.3	36.00	55.0	53.35	55.20	1.85	1.85	58%	No Repairs are Needed
RB 6.029A	LAB 2	Ext	67.5	35.00	55.0	53.35	58.60	5.25	4.45	61%	Repair Thermostat & Steam Valv
RB 6.028	LAB 2	Ext	72.7	36.00	55.0	53.35	73.30	19.95	4.35	n/a	Repair Steam Valve & Damper
RB 6.029	LAB 2	Ext	73.7	33.50	55.0	53.35	74.30	20.95	3.35	n/a	Repair Steam Valve & Damper
RB 6.026	LAB 3	Ext	73.4	33.00	56.0	53.35	60.30	6.95	4.65	28%	Repair Steam Valve & Damper
RB 6.025	LAB 1	Ext	70.4	33.90	57.0	54.06	55.00	0.94	0.74	58%	Repair Thermostat
RB 7.029	OFF	Ext	73.6	40.50	57.0	52.58	66.10	13.52	13.12	-28%	Repair Steam Valve & Damper
RB 6.024	LAB 2	Ext	73.5	31.30	58.0	54.06	58.10	4.04	4.04	38%	Repair Steam Valve & Damper
RB 6.024A	LAB 2	Ext	76.0	39.00	58.0	54.06	75.00	20.94	2.44	-50%	No Repairs are Needed
RB 7.035A	LAB	Ext	74.9	43.00	60.0	51.90	57.70	5.80	5.80	37%	Repair Steam Valve & Damper
RB 7.035K	LAB	Ext	75.7	37.00	60.0	51.70	57.60	5.90	5.90	35%	Repair Steam Valve & Damper
RB 7.024	LAB 6	Ext	73.5	34.20	61.0	54.41	57.30	2.89	2.89	41%	Repair Steam Valve & Damper
RB 7.024B	OFF	Ext	70.2	40.00	61.0	54.41	58.10	3.69	0.59	49%	No Repairs are Needed
RB 7.025B	LAB 6	Ext	72.1	35.00	61.0	54.63	59.00	4.37	1.37	38%	No Repairs are Needed
RB 7.026A	LAB 6	Ext	75.2	30.90	61.0	54.88	59.90	5.02	3.42	27%	Repair Steam Valve & Damper
RB 7.028A	LAB 6	Ext	71.5	38.00	61.0	54.96	60.80	5.84	5.64	30%	Repair Thermostat & Steam Valv
RB 7.025	LAB 6	Ext	72.4	36.00	61.0	54.60	60.80	6.20	5.20	28%	Repair Steam Valve & Damper
RB 7.025A	LAB 6	Ext	72.1	34.00	61.0	54.50	61.00	6.50	3.00	27%	Repair Thermostat & Steam Valv
RB 7.026B	LAB 6	Ext	76.0	33.00	61.0	54.70	63.70	9.00	5.80	2%	Repair Steam Valve & Damper
RB 7.028	LAB 6	Ext	74.2	33.50	61.0	55.04	68.50	13.46	12.26	-50%	Repair Steam Valve & Damper
RB 7.028B	LAB 6	Ext	72.6	35.20	61.0	54.96	68.50	13.54	3.74	-50%	Repair Steam Valve & Damper
RB 7.026	LAB 6	Ext	76.7	30.00	61.0	54.73	75.70	20.97	5.77	-50%	Repair Steam Valve & Damper
RB 7.024A	OFF	Ext	74.1	33.90	61.0	54.41	76.50	22.09	6.29	n/a	Repair Steam Valve & Damper
RB 5.024	LAB 2	Ext	74.5	29.70	62.0	53.00	72.80	19.80	9.70	-50%	Repair Steam Valve & Damper
RB 5.025	LAB 1	Ext	74.7	30.00	63.0	53.00	54.70	1.70	1.70	47%	No Repairs are Needed
RB 5.026	LAB 3	Ext	70.7	32.40	63.0	53.00	55.50	2.50	2.10	56%	No Repairs are Needed
RB 7.035J	LAB	Ext	75.5	37.00	63.0	50.24	54.20	3.96	3.96	46%	Repair Steam Valve & Damper
RB 5.024A	LAB 2	Ext	75.6	28.70	63.0	53.00	74.10	21.10	2.50	-50%	No Repairs are Needed
RB 5.030	OFF	Ext	73.4	29.20	64.0	53.00	59.20	6.20	2.50	34%	No Repairs are Needed
RB 5.028	LAB 2	Ext	76.6	26.70	64.0	53.00	74.00	21.00	5.10	-50%	Repair Steam Valve & Damper
RB 5.029A	LAB 2	Ext	73.5	29.50	65.0	53.00	57.10	4.10	4.10	42%	Repair Steam Valve & Damper
RB 5.029	LAB 2	Ext	74.6	29.00	65.0	53.00	72.40	19.40	5.00	-50%	Repair Steam Valve & Damper
RB 6.039	EQUIP	Ext	72.3	31.20	68.0	52.55	54.10	1.55	1.55	54%	No Repairs are Needed
RB 6.030	OFF	Ext	72.2	29.80	68.0	52.55	58.30	5.75	2.95	41%	Repair Steam Valve & Damper
RB 3.039	EQUIP	Ext	77.7	37.00	70.0	50.49	55.10	4.61	3.21	39%	Repair Steam Valve & Damper

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UNIT LOC/SERVES ROOM #	TYPE	INT/EXT	RM. TEMP F	ROOM RH	AMBIENT TEMP. F	COLD DECK DISCHARGE TEMP (F)	DIFFUSER DISCHARGE TEMP (F)	REHEAT F	LEAKAGE F	% AIR REDUCTION/ INCREASE	REPAIR MEASURE
RB 3.032	OFF	Ext	74.0	41.00	71.0	50.49	69.70	19.21	N/A	-50%	Check Terminal Box
RB 3.031	OFF	Ext	73.3	41.00	71.0	50.49	69.70	19.21	N/A	-50%	Check Terminal Box
RB 3.030	OFF	Ext	73.7	41.00	71.0	50.49	69.70	19.21	5.21	-50%	Repair Steam Valve & Damper
RB 3.029	LAB 2	Ext	72.9	41.00	71.0	50.74	72.50	21.76	4.86	-50%	Repair Thermostat & Steam Valv
RB 3.025	LAB 1	Ext	73.0	43.20	72.0	50.74	53.30	2.56	N/A	54%	No Repairs are Needed
RB 3.028	LAB 2	Ext	71.6	44.20	72.0	50.74	54.10	3.36	3.06	57%	Repair Steam Valve & Damper
RB 3.026	LAB 3	Ext	71.8	44.00	72.0	50.74	63.50	12.76	13.56	6%	Repair Thermostat & Steam Valv
RB 3.028A	LAB 2	Ext	74.4	40.00	72.0	50.74	82.40	31.66	4.06	n/a	Repair Steam Valve & Damper
RB 3.024	LAB 2	Ext	71.6	42.50	73.0	50.74	65.70	14.96	14.96	-29%	Repair Steam Valve & Damper
RB 3.024A	LAB 2	Ext	73.0	41.40	73.0	50.74	69.70	18.96	4.76	-50%	Repair Steam Valve & Damper
RB 3.29A	LAB 2	Ext	72.2	43.40	76.0	51.26	54.80	3.54	3.14	53%	Repair Thermostat & Steam Valv
RB 2.030	OFF	Ext	69.0	51.20	78.0	52.99	55.20	2.21	N/A	64%	Check Terminal Box
RB 2.029A	LAB 2	Ext	72.0	47.00	78.0	52.99	57.20	4.21	N/A	46%	Check Terminal Box
RB 4.025	LAB 1	Ext	73.0	43.70	79.0	50.97	53.90	2.93	2.93	53%	Repair Steam Valve & Damper
RB 4.028	LAB 2	Ext	75.6	40.30	79.0	50.97	57.70	6.73	7.13	35%	Repair Steam Valve & Damper
RB 4.029	LAB 2	Ext	75.4	39.80	79.0	50.97	58.00	7.03	6.73	34%	Repair Steam Valve & Damper
RB 4.024A	LAB 2	Ext	74.0	40.20	79.0	51.15	63.40	12.25	3.85	6%	Repair Steam Valve & Damper
RB 4.026	LAB 3	Ext	73.3	41.50	79.0	50.97	65.10	14.13	5.93	-13%	Repair Steam Valve & Damper
RB 4.030	OFF	Ext	76.5	39.00	79.0	50.97	68.40	17.43	N/A	-50%	No Repairs are Needed
RB 4.029A	LAB 2	Ext	75.3	38.40	79.0	50.97	68.60	17.63	5.83	-50%	Repair Steam Valve & Damper
RB 2.028	LAB 2	Ext	75.9	40.40	79.0	52.99	72.40	19.41	N/A	-50%	Check Terminal Box
RB 4.024	LAB 2	Ext	73.3	41.70	79.0	51.05	77.40	26.35	5.45	n/a	Repair Steam Valve & Damper
RB 2.028A	LAB 2	Ext	77.7	40.10	79.0	52.69	80.40	27.71	N/A	n/a	Check Terminal Box
RB 2.025	LAB 1	Ext	71.4	47.60	80.0	52.69	56.90	4.21	N/A	49%	Check Terminal Box
RB 2.002	LAB	Ext	73.2	43.00	80.0	52.69	67.00	14.31	N/A	-48%	Check Terminal Box
RB 2.026	LAB 3	Ext	73.1	42.70	80.0	52.69	67.50	14.81	N/A	-50%	Check Terminal Box
RB 2.024	LAB 2	Ext	73.5	45.00	80.0	52.69	75.00	22.31	N/A	n/a	Check Terminal Box
RB 5.039	EQUIP	Int	75.4	31.00	54.0	52.00	52.70	0.70	0.20	50%	No Repairs are Needed
RB 7.027B	LAB 6	Int	73.1	34.70	61.0	55.04	60.80	5.76	4.86	26%	Repair Steam Valve & Damper
RB 7.027A	LAB 6	Int	74.0	34.00	61.0	55.01	66.00	10.99	3.09	-25%	Repair Steam Valve & Damper
RB 7.027	LAB 6	Int	74.5	32.00	61.0	54.04	69.40	15.36	5.96	-50%	Repair Steam Valve & Damper
RB 2.039	EQUIP	Int	74.8	45.00	76.0	52.99	67.40	14.41	N/A	-46%	Check Terminal Box
RB 4.039	EQUIP	Int	77.6	36.70	78.0	51.04	61.00	9.96	N/A	18%	Check Terminal Box
Average			**73.63**	**37.35**	**67.46**	**52.64**	**63.96**	**11.31**	**4.75**		
RB 2.024A	LAB 2		N/A	42.00	N/A	N/A	N/A	N/A	N/A		Check Terminal Box
RB 2.029	LAB 2		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No Repairs are Needed

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UNIT LOC/SERVES ROOM #	TYPE	INT/EXT	RM. TEMP F	ROOM RH	AMBIENT TEMP. F	COLD DECK DISCHARGE TEMP (F)	DIFFUSER DISCHARGE TEMP (F)	REHEAT F	LEAKAGE F	% AIR REDUCTION/ INCREASE	REPAIR MEASURE
RB 2.H000D	COR		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No Repairs are Needed
RB 3.H000D	COR		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No Repairs are Needed
RB 4.H000D	COR		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No Repairs are Needed
RB 4.028A	LAB 2		76.4	37.40	79.0	50.97	N/A	N/A	N/A		No Repairs are Needed
RB 5.H00D	COR		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No Repairs are Needed
RB 5.028A	LAB 2		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No Repairs are Needed
RB 6.H00D	COR		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No Repairs are Needed
RB 7.032	STORAGE		N/A	40.00	N/A	N/A	61.50	N/A	N/A		No Repairs are Needed
RB 7.H000E	COR		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No Repairs are Needed
RB H00D	COR		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No Repairs are Needed